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Peptic Ulcer

Its Roentgen Diagnosis and Surgical Indications
Trenery Lecture—1950

C. J. KARIBO, D.O., F.A.O.C.R.
Detroit

Being chosen to give the Trenery Lecture is a great honor and tribute; it also carries with it a tremendous responsibility. This Lecture is probably the most significant to be delivered at the annual meeting of the American Osteopathic College of Radiology. It was instituted in 1940 and has been presented on the first day of the College meetings since that time. The Lecture is devoted to the perpetuation of the memory of Dr. Floyd Trenery who, in collaboration with other established and capable men in the field of radiology, labored unselfishly toward the organization and establishment of the College of Radiology of which we as privileged members are so justly proud.

Dr. Trenery's professional ability together with his enthusiasm and unlimited energy formed the nucleus from which the basic organizational work was evolved. The Lecture has become increasingly important through the past decade, not only because of the increased appreciation of the man for whom it was founded but also because of the growing prestige it has attained due to the capabilities of the men who have preceded me in the delivery of this presentation. If Dr. Trenery were alive today, I am sure he would be highly pleased and impressed with the significant progress the College has made since its inception, and also with the realization of the tremendous contribution it has made to the profession.

It was my personal privilege to know Dr. Trenery rather intimately in the last few years of his active life. He impressed me as a truly great man from the standpoints of his personality, his exhaustive thoroughness, and his professional ability. One feature that was particularly significant to me was the fact that he exhibited a great sense of courage in his latter years, when he was obviously suffering from the disease which subsequently claimed his life. I do not mean the type of courage that most of us have in meeting a crisis, but the kind of courage that is required to carry out ordinary duties in spite of pain and the realization that one's span of life is definitely limited. In the face of these adversities Dr. Trenery showed great courage and enthusiasm, and he met his problems with quiet humor and good nature. His life should be a constant inspiration to all of us who follow in his footsteps.

Floyd J. Trenery was born on June 1, 1891. He was the son of Albert L. Trenery and Elsie Wood. He started his education in a prairie town in South Dakota and finished high school in Spencer, Iowa. After having completed 1 year of university work he entered Des Moines Still College in 1912 and received his degree cum laude in 1915. He remained there for an additional year of special work in anatomy, physical diagnosis, and roentgenology.

In the fall of 1916 Dr. Trenery took over the superintendency of the Des Moines General Hospital, a position he held until 1926. During this time his major attention was devoted to radiology. He was a member of the faculty of the Des Moines Still College of Osteopathy and took an active part in the professional affairs of the state of Iowa. In the summer of 1926 he accepted an invitation to join the Los Angeles Clinical Group and took charge of the x-ray department at the Monte Sano Hospital where he worked until 1938. He then erected his own building and limited his practice to high-voltage x-ray therapy and radium therapy.

Dr. Trenery's recreations were hunting and fishing. However, he never felt the need of a hobby, saying always that his work was his chief source of relaxation. His nature was quiet. Outside of following current events, his reading was directed almost entirely to professional literature to keep abreast of his field. He availed himself of every possible opportunity to attend radiological meetings as well as other professional conventions.

Dr. Trenery died on February 27, 1943, at the age of 51 years, succumbing to a longstanding illness of a cardiovascular-renal nature.

The subject assigned for the Trenery Lecture of 1950 is particularly appropriate, I believe, because Dr. Trenery was enthusiastically interested in the field of roentgen diagnosis of diseases of the gastrointestinal tract, particularly peptic ulcer.

ETIOLOGY OF PEPTIC ULCER

The etiology of peptic ulcer is not known. For over a century clinicians and pathologists have been investigating this disease; although many theories have been advanced to explain peptic ulcer, none has been definitely proved. It is known that the disease is of a seasonal character and that the greatest incidence is noted in the spring and fall.[1] Furthermore, it is known that there is a definite predilection to the male, the ratio being about 3 to 1. To better analyze the various conflicting opinions as to what constitutes the etiology of peptic ulcer it might be well to formulate some concrete questions. For instance, what causes ulcer formation, and why do peptic ulcers show a partiality to the lesser curvature margin of the prepyloric portion of the stomach and duodenum? Why do acute ulcers apparently heal rapidly, and why do other ulcers become chronic?

Several years ago Necheles[2] made an excellent survey of the theories regarding peptic ulcer which I would like to summarize briefly.

Proponents of the acid theory maintain that a more or less constant state of hypertonicity and gastric hypersecretion tend to break down the resistance of the gastric or duodenal mucosa. This state not only produces the ulcer but also causes it to become chronic. Another school of thought contends that peptic ulceration can be explained on the basis of altered vascular changes within the mucosa and submucosa.

We know that vasoconstriction undoubtedly occurs in the normal stomach. Blanching of the mucosa and serosa incidental to emotional states such as anger and

fear demonstrates this. Erosion, bleeding, and ulceration, however, have been seen only when the mucosa was engorged and when acid secretion and motility were quite active. Wolf and Wolff[3] have shown that in this state the mucosa is very susceptible to injury. In their experiments they found that when the mucosa was denuded of its protective mucus by trauma, ulcers formed. They therefore reasoned that depression of mucus secretion within the stomach and duodenum is a basic cause of chronic ulcer.

Many of the changes in the stomach and duodenum have been attributed to anoxemia due to vascular stasis or vasoconstriction. The question then raised is: Can the production of peptic ulcer be explained on the theory of vasoconstriction or spasm in view of the fact that the stomach and duodenum are two of the most vascularized organs in the body?

Numerous end-arteries are found at the lesser curvature margin of the stomach and duodenum. It has been noted experimentally and practically that if an end-artery is obstructed, the region supplied by it develops necrosis because of inadequate collateral blood supply. The high incidence of peptic ulcer in those conditions in which embolism is known to occur, such as following operation, in polycythemia, after burns, and so forth, can easily be explained by this mechanism. These ulcers, which are acute or subacute, represent only a small percentage of the ulcers seen, however.

Various factors can produce a state of anoxemia of the stomach or duodenum in an otherwise healthy person. Dale and Feldberg[4] believe that the vagus-acetylcholine mechanism may be responsible. They found that a definite increase of acetylcholine occurs in gastric venous blood following vagal stimulation. Experiments by Necheles and his coworkers[5] corroborated their results. Working with rats Necheles and his associates found that acetylcholine produced a reduction of arterial flow up to 44 per cent on the arterial side. Similar experimentation with dogs[6] produced a reduction of venous flow from between 31 to 96 per cent. It was also noted that gastric juice contains acetylcholine and that the concentration of acetylcholine increases following stimulation, particularly with histamine.

The vagi are the principal secretory and motor nerves of the stomach. Acetylcholine and other choline esters increase gastric secretion and motility; hence it is assumed that it is the acetylcholine which mediates the vagus effects on the stomach. Furthermore, it is a well-established fact that the hypermotility, hypertonicity, and hypersecretion—often continuing throughout the night—in ulcer patients represents not only an increased but apparently a constant vagus activity. Thus chronologically, the probable causes of gastric or duodenal ulcers are: (1) the anatomical situation of end-arteries within the stomach and duodenum which apparently determines the sites of predilection for the development of peptic ulcer, and (2) the continuous vagal stimulation which produces constant liberation of acetylcholine which in turn produces vasoconstriction followed by anoxemia of the tissues affected.

It has been shown that during a state of anoxia the gastric mucosa needs glucose; otherwise the mucosa degenerates rapidly producing acute ulceration. Under continuous vagal stimulation such ulcers may become chronic. It would seem, then, that hydrochloric acid and pepsin are not necessary for the development of peptic ulcer. There are other arguments to oppose the acid theory. Ulcers have been found in the esophagus, the lower duodenum, the jejunum, ileum, and colon without relation to the degree of acidity needed for digestion. Ulcers have also been found in diabetic patients having low gastric acidity or a histamine-refractory type of anacidity. Many persons with high gastric acidity are ulcer free while others with low gastric acidity have ulcers. In fact, some patients with healed ulcers have shown a higher acid level following healing than they did when the ulcer was radiologically and clinically active. A few cases are on record of excellent clinical cures following vagotomy despite unchanged acid levels. Therefore, in the light of our present knowledge of physiopathology of peptic ulcer we must consider the old dictum, "no acid, no ulcer," invalid.

One observation which seems to be important at this point in the consideration of peptic ulcer is that psychosomatic disturbance may produce an ulcer. Such a disturbance may also aggravate a pre-existing ulcer, or it may incite the recurrence of an apparently healed ulcer.

An ulcer within the stomach or duodenum is surrounded by an area of congestion and edema of the mucosa and submucosa which results in a painful type of phenomenon, particularly when waves of peristalsis pass through the involved area. An increased blood flow within the gastrointestinal tract following a meal or the administration of certain drugs may drain the edema and thereby alleviate the pain. Spasmolytic drugs are useful in diminishing the tone, motility, or spasm of the affected segment. Hemorrhage relieves pain by reducing congestion in the area. On the other hand, if there is little inflammatory reaction, an acute ulcer may be relatively painless and give no indication of its existence until perforation or hemorrhage takes place.

ROENTGEN DIAGNOSIS

A far reaching advance in the diagnosis of peptic ulcer was brought about by the development of the roentgen ray method of examination. Hemmeter[7] first used the roentgen ray to show the presence of experimentally produced peptic ulcers in animals in 1906. In 1909 Reiche[8] found that the crater of an ulcer could be visualized in humans by the use of an opaque agent. From his experiments he concluded that there is definite evidence of altered tonicity and motility of the stomach and duodenum in the presence of ulcer. Haudek,[9] in 1910, elaborated upon Reiche's procedure and verified its practical value in numerous cases which were subsequently confirmed by surgical procedure or autopsy. In 1914 Cole[10] gave a classic description of the essential factors in the diagnosis of duodenal ulcer. He based his diagnosis on a recognition of "a constant deformity of the cap or sphincter, caused by the induration or cicatricial contraction surrounding the crater of an ulcer, or resulting therefrom." In addition, he recognized the roentgenological significance of the direct visualization of the crater itself both in profile and full face in order to differentiate a normal, but distended, cap from the pouching or bullet-hole pocket of an ulcerating lesion.

Today, roentgen diagnosis of peptic ulcer has been placed upon such a remarkably sound foundation that it represents indisputable objective evidence in the vast majority of cases. It is not unfair to say that roentgen ray procedure supercedes all other methods in arriving at this type of diagnosis. Extremely im-

Fig. 1

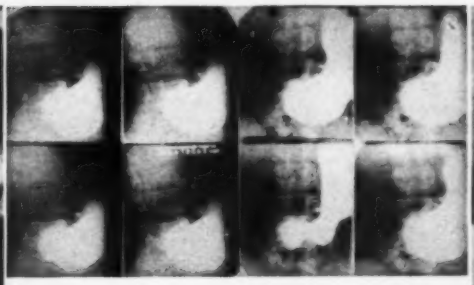

Fig. 2

Fig. 3

Fig. 1. Annular constriction and elongation of the prepyloric segment of the stomach extending into the pyloric sphincter, with signs of early obstructive phenomena. These findings undoubtedly represent a sequel of prepyloric ulceration. Fig. 2. Small penetrating ulcer springing from the lesser curvature margin of the pars media of the stomach, well circumscribed and apparently benign. Fig. 3. Small penetrating duodenal ulcer with crater located in the base of the duodenal cap with a pseudodiverticulum contained within the cap; associated hypertrophic gastroduodenitis.

portant as the clinical history is, it gives only suggestive aid. It is not unusual for a patient with a history typical of ulcer to be found negative at roentgen investigation and, conversely, one who has an insignificant history to be found presenting signs of peptic ulcer. Most authorities agree that roentgen diagnosis of peptic ulcer should be about 90 per cent accurate, providing the patient is being examined by a capable roentgenologist. It is my conviction that the incidence of accuracy is in direct proportion to the facilities and the experience of the roentgenologist conducting the examination.

In the roentgen examination of peptic ulcers five types of gastric and duodenal ulcers are noted. Feldman[11] has classified them thus:

1. Mucosal erosions which as a rule are not demonstrable radiologically or fluoroscopically but are frequently seen at gastroscopy
2. Penetrating ulcers representing those ulcers which have penetrated through the various layers of the stomach or duodenum but usually have not penetrated through the serosa
3. Perforating ulcers representing those ulcers which have perforated through the various walls of the viscus including the serosa
4. Carcinomatous ulcers
5. Ulcerating benign tumors.

The important roentgen signs of gastric and duodenal ulcer are:

1. The niche or ulcer crater
2. Concave depression or halo around the niche seen in the en face view.
3. Spastic manifestations such as varying degrees of spasm, hourglass deformity, pylorospasm, and so forth
4. Gastric retention
5. Mucosal changes, namely mucosal hypertrophy and convergence of the folds toward the ulcer crater
6. Accessory air-pocket seen in the slow type of penetrating ulcer through the various layers of the gastric or duodenal wall.

The only pathognomonic sign of the presence of ulcer, however, is the ulcer crater or niche. At one time the term niche applied only to the roentgen appearance of a perforating type of ulcer. Today the term is used to designate the crater of any ulcer regardless of degree of penetration. In the diagnosis of chronic perforating ulcer it is very important to be able to demonstrate the various layered densities within the niche as seen with the patient in the erect position. Buckstein[12] points out that in a typical case one may note the presence of three distinct layers beginning with "a dense layer of barium at the lower portion of the niche surmounted by a less dense layer with a fluid level which is capped by an air bubble." An ulcer of this type will frequently adhere to the pancreas or to the under surface of the liver. As a rule the niche is rounded and has a comparatively smooth outline. Irregularity of the niche margin suggests the possibility of neoplasm.

Numerous factors, particularly in the region of the stomach, may produce confusing shadows which mimic an ulcer niche. Buckstein[12] lists them as:

1. A diverticulum at the duodenojejunal juncture
2. An atypical peristaltic wave
3. The projection of barium within the duodenal mucosa at the juncture of the duodenum and jejunum
4. A calcified area of extragastric or duodenal location which may show up around the curvature margins of the stomach or duodenum.

Differentiating a gastric diverticulum is usually a relatively simple matter because, as a rule, diverticula are located along the posterior wall of the cardiac portion and gastric ulcer in this location is quite rare. Signs of spastic phenomena which are characteristic of ulcer are not seen in the region of the diverticulum. In addition, a gastric diverticulum usually has a plainly demonstrated pedicle extending from the gastric lumen to the area of saccular dilatation; in gastric ulcer such a communication is seldom seen.

Estimation of the depth of an ulcer niche is a very important and sometimes difficult matter. Frequently the edema and congestion of the mucosa and submucosa at the ulcer site results in a heaping up of the membrane around the ulcer niche making it very difficult to determine whether the apparent depth of the niche is due to this factor or to the protrusion of the ulcer through the various layers of the affected organ. The more superficial ulcers may be entirely overlooked at roentgen examination or may show only

indirect signs of presence such as hyperperistalsis, increased tonicity, incisura, or delayed gastric evacuation. These lesions can be recognized by close study utilizing compression of the mucosal relief pattern. This technic is useful in demonstrating a niche caused chiefly by the piling up of surrounding membrane folds.

An accurate determination of the depth of an ulcer is important to the surgeon as well as to the roentgenologist. At operation the surgeon may fail to find a superficial lesion reported by the roentgenologist unless he opens the lumen of the stomach for direct inspection. All of us in roentgenology have been chagrined at times over the fact that we are unable to demonstrate the presence of an ulcer crater in a patient who we feel has every clinical sign of gastric or duodenal ulcer, sometimes including an episode of hematemesis or tarry stools. These apparent failures can undoubtedly be traced to regional hypertrophy or edematous membrane about the crater or to the presence of a clot or particles of food debris within the niche itself. Reexamination within a short time will frequently offset this particular problem.

In 1926, Fränkel[13] reported that in the absence of a definite niche formation an important sign of the existence of ulcer is the presence of a localized area of apparent induration within the gastric wall which is devoid of peristaltic activity. He called this area the *ulkus riegel* or crossbar sign. This phenomenon may be present in those cases where the crater is obstructed. It may also be observed in patients undergoing healing of an ulcer. Radiation and convergence of the membrane folds at the site of ulceration is another important sign of ulcer. This phenomenon is apparently the result of three factors:

1. Contraction of the mucosa muscularis at the ulcer site
2. Formation of scar tissue in chronic ulcer
3. Edema of the mucosal folds.

The niche of a benign ulcer usually has a smooth, well-rounded contour when completely distended with barium. There are, however, a few factors which may alter its outline, for instance:

1. A blood vessel may intrude into the lumen of the niche.
2. The ulcer may have perforated so that the floor is made up of pancreatic or liver tissue in which case one or more radiolucent areas may be seen within the confines of the niche.
3. A walled-off subacute perforation or intrusion of the omentum sealing off a point of perforation may cause irregularity.

The demonstration of an intact mucosal pattern is an important aid in establishing whether or not an ulcer is benign. In some instances a mucosal study is essential to demonstrate an ulcer which otherwise might go unnoticed. This is especially true when the ulcer site is on the posterior wall of the stomach or duodenum. Carman[14] describes a meniscus-like defect usually seen in the region of the lesser curvature margin of the stomach which he feels is highly suggestive of a malignant type of cancer. This phenomenon, which is known as Carman's meniscus sign, is best demonstrated with the patient in the vertical position.

Other important findings in duodenal ulcer are:

1. The constant cone-shaped deformity of the duodenal cap as a result of scar formation

2. The eccentric position of the pyloric sphincter in relation to the cap due to cicatrization and contraction of the duodenal musculature

3. The demonstration of a pseudodiverticulum in the base of the cap in instances of mild obstructive mechanism within the duodenum.

In both gastric and duodenal ulcer there may be localized point tenderness, but this in itself is not a reliable sign. Hypertonicity of the duodenum also may frequently exist. However, this condition, which is explained on a reflex basis, constitutes, along with spasm of the sphincter and gastric antrum, only a contributory finding of ulcer. The demonstration of an ulcer niche still is the only irrefutable evidence of duodenal ulcer.

Other duodenal bulb deformities are caused by the presence of intrinsic masses such as papillomas and polyps and also by such extrinsic factors as pressure from the pancreas, the liver, or the right kidney. Also marked deformity may be produced by paraduodenal adhesions from gallbladder disease. Kirklin[15] describes a syndrome of duodenitis in which the patient has symptoms very similar to those of duodenal ulcer. The absence of an ulcer niche tends to differentiate duodenitis from the true duodenal ulcer, however.

Scarring and spasm in duodenal ulcer may be so complete as to make the cap practically indistinguishable. The severe obstructive mechanism resulting from this condition has previously been evaluated. In the event that the cap cannot be recognized it may be necessary for the roentgenologist simply to report evidence of postpyloric obstruction, probably resulting from duodenal ulcer.

Duodenal ulcer is seldom seen beyond the bulb. When it does occur it is usually found in the descend- portion of the duodenum and is characterized by a well-circumscribed, annular narrowing of the lumen which may show evidence of a crater. If a crater can be demonstrated, a differential diagnosis must be made between ulcer and duodenal diverticulum. Two factors help to differentiate duodenal ulcer from duodenal diverticulum. The first is the absence in a diverticulum of the narrowing of the duodenal lumen which is characteristic of ulcer. The second involves the retention of barium. In a case of ulcer only a fleck of barium can be detected in the niche; in a diverticulum, however, a well-outlined, saccular, extraluminal projection can be seen.

The importance of roentgenologically differentiating benign and malignant ulcers of the stomach has been stressed by Holmes and Hampton[16] and by Camp.[17] This is not a problem in ulcerating lesions of the duodenum because the incidence of neoplasms in this locality is practically nonexistent. However, differentiating between benign and malignant lesions in the pyloric antrum, especially those involving the posterior wall, is particularly difficult. Here ulcerating lesions are apt to be associated with secondary spasm and hypertrophic gastritis. Such conditions may cause annular narrowing of the pylorus, engorgement of the mucosal folds, and even translucent defects within the antrum which are very difficult to differentiate from neoplasm. Further complications arise from the fact that this is the area in which the picture of chronic gastritis is most prominent. Moreover gallbladder disease, appendicitis, and other such extragastric lesions give rise to reflex phenomena in this area, and polyps and adenomas are frequently found here. It is there-

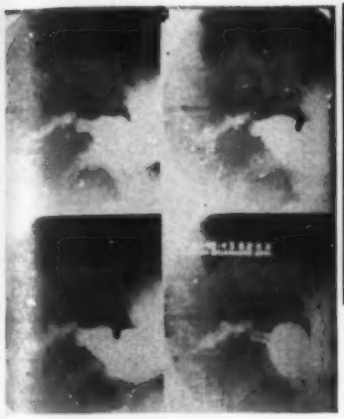

Fig. 4

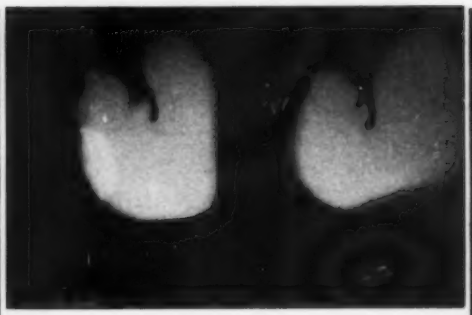

Fig. 5

Fig. 6

Fig. 4. Chronic cicatrizing duodenal ulcer with typical coral-shaped deformity. No conclusive signs of obstruction could be demonstrated. Fig. 5. Cicatrizing duodenal ulcer with marked obstruction and resulting gastrectasis. Fig. 6. Same case 5 hours after the administration of barium. Note the large quantity of barium retained in the stomach and the small quantity in the small intestinal tract.

fore obvious that every effort should be made to investigate thoroughly, both roentgenoscopically and radiographically, the area of the pylorus. For maximum visualization of the mucosal relief pattern, small amounts of relatively thin barium should be used. An intact and well-preserved mucosa suggests a benign lesion; a disrupted, destroyed membrane suggests neoplasm.

According to Buckstein[12] the following are the important changes which may occur at the pyloric ring as a result of ulcer in that area:

1. The pyloric ring may be angulated or slightly curved, presumably as a result of cicatrization due to ulceration.

2. There may be elongation of the canal as a result of narrowing of the area due to prominence of the mucosal folds.

As a result of these changes the ring may stiffen and show no response to peristaltic activity. However, demonstration of a niche is still the most significant aid to a correct diagnosis of ulcer.

Ulceration may cause certain anatomical changes in the size and contour of the stomach. As early as 1904 Moynihan[18] showed that the concept which held that hourglass deformity was due to congenital causes was eronneous and that such deformity was almost always secondary to organic disease, usually gastric ulcer. In a few cases, however, such deformity may be functional.

In an organic type of hourglass deformity, the narrowed portion is more extensive than that found in the functional lesion, and in effect divides the stomach into two separate locules connected by an elongated canal at the site of the lesser curvature. An ulcer niche may or may not be seen at the margin of the contracted area. As the process of narrowing continues the upper locule may be partially obstructed from the lower. If a gastric hourglass deformity is the result of an organic disease it will not respond to antispasmodic therapy or alter its characteristics from one examination to the next. In other words, it will be a constant defect. This fact should help to differentiate the inflammatory from the neoplastic type of alteration. Organic hourglass deformity, then, is due to three factors: (1) Spasm of the circular muscle fibers of the stomach, (2) inflammatory edema, and (3) organic stricture caused by the formation of scar tissue.

Infiltrative annular carcinoma of the stomach in the region of the pars media may simulate hourglass deformity. However, in carcinoma the margins of the affected area are irregular and the upper and lower limits of the lesion are sharply demarcated. In hourglass deformity the gastric margins are smooth and regular and there is poor demarcation of the lesion at the adjacent normal gastric wall. Also, in gastric carcinoma the lumen of the stomach in the affected area shows less tendency toward severe narrowing and consequent obstruction than it does in hourglass deformity due to ulcer.

Gastric ulcer is responsible for another deformity of the lesser curvature margin of the stomach that is best described as a snail-like retraction. Schmieden and Hartel[19] were the first to describe this deformity which is caused by a shortening of the lesser curvature on either side of the niche. Contraction of the scar tissue and spasm of the longitudinal muscle fibers are largely responsible for this process. As the degree of retraction increases it becomes more and more difficult to see the niche.

Radiologically the effect of the ulcer upon gastric motility is of great significance. If the ulcer site is in close proximity to the sphincter it may directly involve the sphincter to such an extent that motor function is inhibited. This situation is usually the result of either spasm or actual organic cicatricial stenosis. If this condition continues gastrectasis and eventually stasis will develop. If the ulcer is located somewhat less proximally to the sphincter it may produce a gaping pylorus allowing rapid barium transit through the sphincter, or it may produce pylorospasm with gastric retention. There also may be actual hypertrophic changes occurring in the sphincter as a result of both gastric and duodenal ulcer. This phenomenon is usually associated with hypertrophic antral gastritis.

It must be remembered that spasm of the antrum or sphincter, or both, may result in marked delay in gastric evacuation. This fact should be kept in mind when deciding whether a patient should be managed surgically or medically. A marked residue of barium

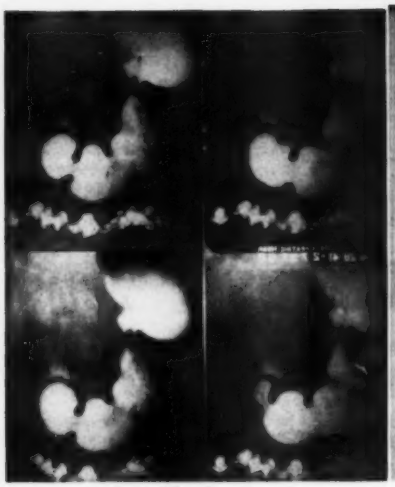

Fig. 7

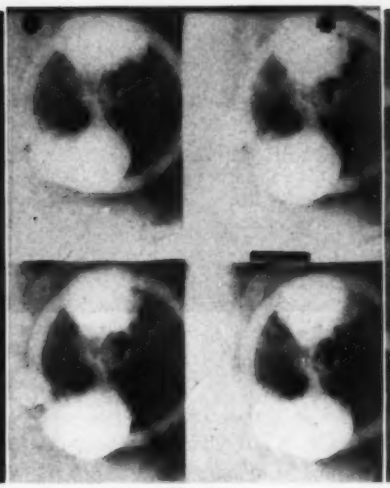

Fig. 8

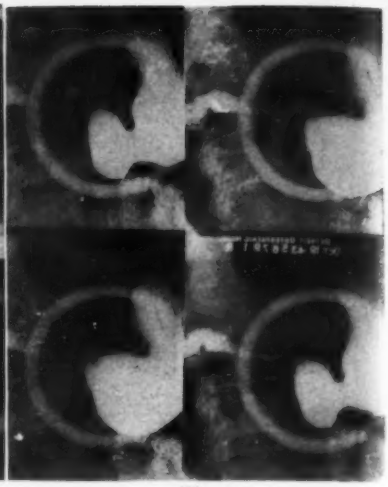

Fig. 9

Fig. 7. Penetrating ulcer located on the lesser curvature margin of the pars cardiaca, with evidence of hour-glass deformity in that vicinity. Fig. 8. Annular infiltrating carcinoma involving the upper portion of the pars media simulating an hour-glass type of deformity. Fig. 9. Severe deformity of the duodenal cap with annular narrowing of the lumen of the second portion which is entirely devoid of mucosal relief pattern. These findings indicate a cicatrizing duodenal ulcer with early obstructive manifestation. The diagnosis was confirmed at surgery.

at the 24-hour period is usually considered an indication for surgical intervention. Before making a final decision gastric lavage and antispasmodic therapy should be applied followed by roentgen reexamination. If gastric retention persists after this treatment it is assumed that the retention is due to organic causes and immediate surgical interference is indicated.

One of the earliest signs of pyloric obstruction is an accentuation of peristaltic activity. This is manifested by increased depth and increased frequency of the individual peristaltic waves and also by the fact that the waves originate in the cardia rather than in the pars media as they ordinarily do. At first increased gastric activity seems to be adequate to overcome the increased resistance in the region of the sphincter or pylorus, but eventually the gastric muscles weaken under the increased demands and gastrectasis results. By this time peristalsis is very sluggish or absent completely. It is at this stage that the stomach of the patient in the upright position shows the typical half moon appearance characteristic of advanced pyloric stenosis. This half moon effect is caused by two things: (1) by the gravitation of the barium to the dependent portion of the stomach, and (2) by the presence of supernatant fluid above the barium level. I have repeatedly seen examples of this phenomenon in patients who demonstrated apparent signs of organic stenosis. Their complaints were usually nausea and copious vomiting occurring in a very abrupt and rapid manner. It is obvious, then, that it was the complication of mucosal edema superimposed upon the pre-existing organic obstruction that precipitated the acute signs of severe obstruction.

BENIGN AND MALIGNANT ULCERS

One of the points of major controversy and speculation among physicians interested in the ulcer problem is the question of the relationship between benign and malignant ulcerations. Apparently Cruveilhier[20] and Rokitansky[21] were the first to report the possibility of carcinoma arising from a primary benign ulcer, a phenomenon which both considered to be quite rare. Although Wilson and MacCarty[22] have reported that carcinoma is a complication in 68 per cent of gastric ulcers, Ewing[23] has seriously criticized these figures. Ewing believes that the transformation of a benign ulcer into carcinoma occurs even less often than the incidence of 5 per cent established by many pathologists.

We know that benign gastric ulcers show a decided partiality for the lesser curvature margin of the stomach and especially for the magenstrasse. When ulcerations are found on the greater curvature margin, however, malignancy should be suspected. Stevenson and Yates[24] state that 96 per cent of the ulcers seen on the greater curvature margin are malignant. However, in my experience I have seen two relatively large ulcers on the greater curvature margin which were subsequently resected and were pathologically proved to be benign.

Size alone is no proof of the malignant character of an ulcerous lesion. However, Marshall and Welch[25] found in their study of 131 cases of chronic gastric ulceration that 61.5 per cent of the malignant ulcers resected were over 2.5 cm. in diameter while only 27 per cent of the benign ulcers were over 2.5 cm. in diameter. On the other hand, MacCarty[26] has concluded that 14.5 per cent of all gastric ulcers under 2.5 cm. are also malignant. Therefore it is the presence of the ulcer on the greater curvature margin rather than the size of the ulcer which offers supportive evidence of malignancy. In considering the potentialities of an ulcer for malignancy, special attention should be paid to the irregularities of the curvature margins adjacent to the ulcer and to changes in the mucosal relief pattern.

Frequently it will be difficult to differentiate roentgenologically between a benign and a malignant ulcer, in which case the aid of the gastroscopist should be sought. Another valuable aid is the clinical therapeutic test. This involves a 30-day regime of strict medical management. If the size of the ulcer diminishes within this period it is a strong indication that the lesion is benign. However even this procedure is not infallible. I have seen ulcers which failed to respond to medical management but which, upon surgi-

Fig. 10

Fig. 11

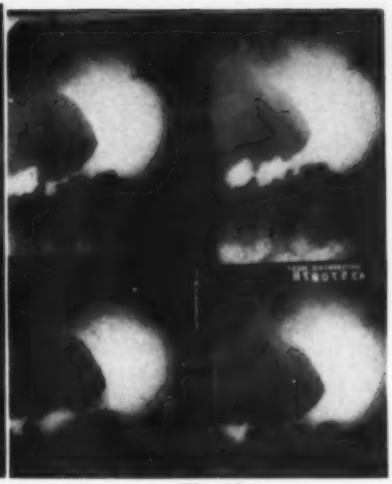

Fig. 12

Fig. 10. Large irregular ulcer crater located on the lesser curvature margin of the pars media. Because of its size and conformation this lesion is to be considered potentially malignant until proved otherwise. Fig. 11. Large ulcer located on the posterior wall of the prepyloric portion of the stomach with an edematous halo about the lesion. The lesion demonstrates the meniscus sign. Fig. 12. Severe deformity of the antral portion of the stomach due to marked hypertrophic antral gastritis. This lesion may well simulate malignant neoplasm. Gastroscopy is of marked assistance in establishing a diagnosis.

cal removal, proved to be pathologically of a benign nature. There was usually considerable cicatrization, however.

HEALING OF ULCERS

It has been known for many years that both gastric and duodenal ulcers frequently heal. Almost a century ago Brinton[27] wrote, "The cicatrix by which the ulcer heals is, on the whole, about as frequently met with as the ulcer itself. In other words, half the instances of this disease undergo what is probably a spontaneous cure." Stewart[28] also found the healing of ulcers to be a common occurrence. In his autopsy studies he found orderly scarring of the mucosa and submucosa and impaired vascularization of the healed area as compared to the surrounding tissues. From a roentgenologic standpoint the niche provides an excellent criterion for determining the healing state of an ulcer. As the healing state progresses there is a diminution of the size of the crater; a complete disappearance of the niche indicates complete healing.

The first to call attention to the value of roentgenology as a method for studying the changes in an ulcer under medical management were Friedenwald and Baetjer.[29] Certainly it is freely admitted today that this type of evaluation is indispensable to intelligent observation of a patient undergoing medical treatment for ulcer. Upon repeated roentgen examination an ulcer crater may show satisfactory retrogression in size for a time and then become static. A crater may also show an increase in size following initial diminution. The gastroscopic serial examination is invaluable for evaluating the changes in the ulcer crater bed and the services of the gastroscopist should be utilized frequently in this capacity.

The average time for complete healing of a gastric ulcer is about 8 weeks in the most responsive cases. A somewhat longer time is required for the healing of a duodenal ulcer. Even very large ulcers have been known to heal with complete restoration of the epithelium and with no visible scars. However, an area which has been the site of an ulcer which has shown subsequent recession of the crater should be regarded with suspicion, particularly if it is a sharply defined, straight, rigid area which is unaltered by peristalsis; recurrence may rapidly take place at this site. This area should be examined roentgenologically—and gastroscopically, if need be—every 30 days until a satisfactory time has elapsed to minimize the possibility of recurrence.

COMPLICATIONS OF PEPTIC ULCER

In a presentation of this type some consideration should be given to the complications of peptic ulcer. The major complications are: (1) obstruction, (2) perforation, and (3) hemorrhage. The roentgenological aspect in obstruction has already been dealt with. Perforation of a peptic ulcer may be any one of six types:

1. *Subacute Perforation.*—Roentgenologically there is little evidence of subacute perforation. Usually, however, the perforation can be detected by the irregular contour of the crater and by a slight trace of barium which can be seen trickling from the ulcer into the surrounding tissue. It is assumed that the perforation has been walled off.

2. *Chronic Perforation.*—In a chronic type of perforation all layers of the stomach or duodenum have been destroyed and either the liver or the pancreas makes up the floor of the ulcer. In such a case the niche shows the layering effect surmounted by an air bubble which I described earlier.

3. *Colonic Perforation.*—Sometimes the ulcer may penetrate into the colon producing a duodenocolic fistula. This can best be demonstrated by means of a barium enema.

4. *Retroperitoneal Perforation.*—The ulcer may also penetrate retroperitoneally in which case air escapes into the retroperitoneal space and sharply delineates the renal shadows.

5. *Biliary Perforation.* — Duodenal ulcers may perforate into the gallbladder or biliary ducts. This results in a duodenocholecystic fistula.

6. *Acute Perforation.* — Acute perforation is marked by the escape of the gastric or duodenal contents into the abdominal cavity. Frequently the escaped

Fig. 13

Fig. 14

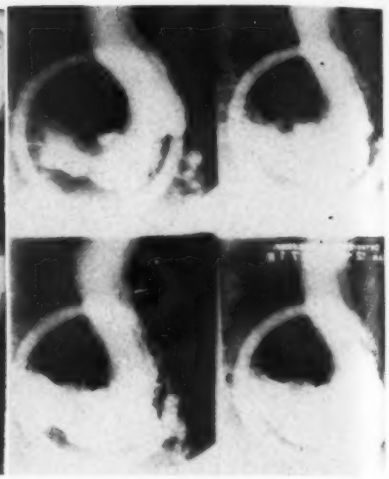

Fig. 15

Fig. 13. Small duodenal diverticulum. Note extraluminal projection of barium of a saccular character without evidence of regional cap spasm. Penetrating duodenal ulcer must be excluded. **Fig. 14.** Severe antral deformity of the stomach with a small penetrating ulcer located on the lesser curvature margin of the antrum. The major deformity is due to antral gastritis. **Fig. 15.** Penetrating ulcer on the lesser curvature margin. Evidence of old perforation and apparent fixation of the ulcer crater to the tail of the pancreas by adhesions.

air from the lumen of the affected viscus accumulates in the upper abdomen and becomes interposed between the diaphragm and the liver producing pneumoperitoneum. There is also an accumlation frequently seen in the upper left quadrant below the left hemidiaphragm.

It is my routine to examine all cases of acute abdominal complaint when there is any suspicion of perforating ulcer. The evaluation is made from a roentgen film of the chest taken with the patient in an upright position. If the patient is too ill to assume such a position the lateral decubitus position may be used for this observation. It must be remembered that other factors besides perforated ulcer may produce free air in the peritoneal cavity; these include perforation of the small bowel incidental to typhoid fever, gunshot wounds, and so forth. Also, traces of free air within the peritoneal cavity are present for about 10 to 14 days following abdominal laparotomy. Obviously the case history is indispensable and is the determining factor in the evaluation of the presence of free air within the abdominal cavity at roentgen examination. A note of warning should be sounded, however, in the evaluation of an apparent air shadow interposed between the right hemidiaphragm and the liver.

A very similar shadow may be elicited in the presence of subdiaphragmatic abscess. Again the history and clinical course will govern such a consideration. Another rare condition that must be considered is the interposition of the right colon between the right hemidiaphragm and the liver. However, the presence of air-filled haustra at the site permits exclusion of that possibility. If there is any doubt, the examination of the colon by means of a barium enema is suggested.

Hemorrhage from ulcer is a very common yet often dangerous complication. According to Thompson[30] 18 per cent of the deaths resulting from peptic ulcer have been due to hemorrhage. Any choice between medical and surgical treatment should be made in consultation with a competent internist. A surgeon should be consulted if emergency surgery seems to be required. The age of the patient is a very important determining factor.[31] If surgery is contemplated it is most ideally done within the first 48 hours following the onset of hemorrhage. It has been observed that in many patients who present signs of hemorrhage there is a strong tendency for ulcers to heal under medical management.

VALUE OF GASTROSCOPY

The gastroscopist can be of inestimable help both to the roentgenologist and to the surgeon in the evaluation of equivocal gastric ulcers and in the determination of their neoplastic potentialities. Unfortunately there are spots within the gastric lumen which cannot be observed by gastroscopy and it is in these areas that the highest incidence of gastric ulcer occurs. Dailey[32] describes three zones of the stomach which are not visible gastroscopically. They are:

1. The posterior wall on which the instrument lies
2. The lowermost lesser curvature behind the incisura angularis
3. The cardiac portion of the stomach which domes above the entrance to the esophagus.

Within the areas of visibility, however, the gastroscopist offers great service by:

1. Establishing a differential diagnosis between benign and malignant ulcers of the stomach
2. Evaluating the status of the associated gastritis which is usually a complication of chronic peptic ulcer
3. Demonstrating the status of healing of gastric ulcer under medical observation and treatment
4. Recognizing the small shallow ulcers which cannot be demonstrated by the roentgenologist.

TECHNIC OF ROENTGEN EXAMINATION

It goes without saying that both detailed fluoroscopic and multiple film examinations are demanded in a roentgen diagnosis of peptic ulcer. It is my firm opinion that fluoroscopy supersedes film examination in importance; however, both procedures are indispensable. Extensive experience in gastrointestinal fluoroscopy is essential. As I have previously stated,

the incidence of accuracy in the diagnosis of chronic peptic ulcer is directly proportionate to the experience of the operator. The incidence of accuracy should run somewhere between 90 and 96 per cent.

The technic in our department calls for the use of a relatively small amount of barium, approximately 6 ounces. Fluoroscopy of the chest, the cardiovascular structures, and the abdomen is carried out prior to the administration of the opaque agent. The patient is then instructed to take one large swallow of barium. The progress of the barium through the upper portion of the gastric viscus is noted. The barium is thoroughly spread over the gastric mucosa in an effort to locate sites of mucosal distortion or ulceration. Then the remaining barium is ingested and the filling and function of the esophagus are observed. The final observation is made of the stomach relative to motility, mobility, tonus, and peristalsis. The transit of the barium through the pyloric sphincter, duodenal cap, and the second and third portions of the duodenum up to and including the duodenojejunal juncture is noted. This completes the fluoroscopic examination. Spot compression films are made of any site of suspected defect. Multiple film examinations are utilized in all cases; I believe that a minimum of eight exposures should be made. The position of the patient is determined by the findings at fluoroscopic examination. To complete the examination a delayed 5 hour film is made. The patient is then given an additional 2 ounces of barium and examined fluoroscopically to determine the status of gastric motility and to study more thoroughly the cardiac portion of the stomach. The examination is made with the patient in the supine position.

A note of warning! Patients presenting signs of gastric or duodenal bleeding should not be examined, if possible, until an attempt has been made to control the bleeding medically. I withhold examinations until the stool is entirely free of macroscopic blood. It is imperative that no palpatory examination be carried out on patients who have given a history of recent gastric or duodenal bleeding.

THERAPEUTIC CONSIDERATIONS

Although it is not strictly the roentgenologist's province to outline the therapeutic program for a patient with peptic ulcer, he must be thoroughly informed of the scope of the disease and of the indications for both medical and surgical therapy in a particular case. Only by the close collaboration of the internist, the surgeon, and the roentgenologist can a therapeutic program of maximum benefit to the patient be evolved. Aid in the selection of borderline cases for surgery should be sought from the internist and his services and opinions should be regarded highly in such circumstances.

As the mortality rate for gastric resection decreases, more and more surgeons are beginning to advocate immediate surgery for all gastric ulcers. Between 10 and 12 per cent of all gastric ulcers roentgenologically diagnosed as benign are actually malignant, while the mortality rate for resection is far below this figure.[25] Therefore, they reason, surgical treatment should be employed as soon as possible. On the other hand, the medical claimants argue that since less than 2 per cent of gastric ulcers are malignant, conservative management should be given a trial before surgery is resorted to. The growing number of patients surgically crippled as a result of resection has also been cited as an argument against immediate, nonselective surgery.

In order to determine the extent of healing under medical management rigid criteria have been set up. They are (1) the complete healing of the crater as shown by roentgenological examination, (2) disappearance of all symptoms, and (3) the absence of occult blood in the stools.

Most operations on the stomach are performed to remove diseased tissue, to decrease gastric acidity, and to reestablish the continuity of the lumen. The many and varied operations devised to obtain these ends are usually performed because of peptic ulceration or neoplasm. Since these two types of lesions tend to recur, most postoperative roentgenological examinations are directed toward finding recurrent ulcers or neoplasm. The recurring benign ulcer is the most common finding. It usually develops about the site of a gastroenterostomy stoma. It is therefore important that the roentgenologist be familiar with the different types of surgical procedures so that he can properly evaluate his findings in such cases.

The various forms of gastric operations are divided into three categories:

1. Those without an anastomosis in which the opening is made and then closed, such as the local resection of a lesion or the closure of a gastroenterostomy
2. Those with an anastomosis of the intestine, either with or without resection
3. Those with an anastomosis to the esophagus.

The various surgical approaches to gastric and duodenal disease include: subtotal and total gastric resection with gastroenterostomy, gastroenterostomy alone, vagotomy, and vagotomy with gastroenterostomy. The operations most commonly used are gastroenterostomy and gastric resection. Pyloroplasty is probably the least used surgical technic today.

The patient with chronic peptic ulcer can be assured of relief of symptoms in all cases if the proper operation is done upon a properly selected case. The relief of the symptoms following adequate ulcer surgery is frequently dramatic. The number of failures should be less than 1 per cent and the mortality rate should be less than 5 per cent. The morbidity incidence is likewise low and the average case is ready for discharge from the hospital between the seventh and the fourteenth postoperative days.

At this point I would like to discuss those complications of peptic ulcer which indicate a need for surgical intervention and also some of the operative procedures that have been used with varying degrees of success.

There are four common complications of ulcer requiring surgical interference:[33]

1. *Obstruction.*—Obstruction may result from either cicatrization, edema, or both. Surgery is usually advisable regardless of whether the obstruction can be relieved medically. The usual procedure is to relieve the obstruction medically, if possible, then to concentrate on building up the patient's nutritional and electrolytic balance. When the patient has reached an optimum physical condition, then is the time to operate.

2. *Severe Hemorrhage.*—Although a common occurrence, severe hemorrhage is one of the most serious complications of peptic ulcer. It is particularly serious

because once the bleeding gets out of control, surgery becomes not only a hazardous but often a fatal undertaking. The safest procedure, therefore, is to operate early in all cases of bleeding. According to Kleitsch,[33] one hemorrhage in a patient over 40 years of age and two hemorrhages in a patient under 40 are sufficient to indicate operative treatment. Indications of bleeding include tarry stools, hematemesis and lowered erythrocyte and hemoglobin levels.

3. *Perforation.*—Immediate surgical intervention is usually indicated in all cases of perforation.

4. *Intractable Pain.*—This condition is usually an indication that the ulcer has penetrated into an adjacent viscus, probably the pancreas, gallbladder, liver, or colon. Since medical management is seldom satisfactory, surgery is the treatment of choice.

It is my belief that gastric ulcer also warrants early surgical intervention because of the danger of malignant degeneration. However, I feel that patients under 40 years of age who show evidence of small ulcers located in the lesser curvature portion of the stomach should be given the benefit of medical management. This includes repeated roentgen ray examinations at 30-day intervals. If the ulcer does not respond to this treatment, then surgical procedures should be carried out. If the patient has a duodenal ulcer then the period of medical management should be extended from between 60 to 90 days inasmuch as the possibility of malignant degeneration is practically nil. Individuals over 40 who have gastric ulcer should be kept under more strict observation.

Once the decision has been made to use some type of surgical procedure it is up to the surgeon to decide which type of operation will give the patient the greatest amount of relief. In the case of peptic ulcer, the physiological aim of surgery is to reduce gastric acidity and motility. Gastric acidity is reduced by resecting the acid-forming portion of the stomach, by neutralizing the gastric secretions with duodenal content, and by interrupting the nerve pathways which stimulate the secretory mechanism of the stomach and the duodenum. The following operations were designed to meet these ends:[33]

1. *Subtotal Gastrectomy.*—For various reasons this is considered the operation of choice in the treatment of chronic peptic ulcer. The results have been uniformly excellent with very little postoperative morbidity reported. In subtotal gastrectomy the acid-forming portion of the stomach is removed. The duodenal secretions which are introduced into the remaining portion of the stomach act as effective neutralizing agents. If necessary, an infradiaphragmatic vagotomy can be performed in conjunction with this operation.

2. *Gastrojejunostomy.*—By and large gastrojejunostomy is considered a palliative measure only. It is usually reserved for those patients who show obstruction or who are otherwise unsuitable for resection because of adhesions and so forth. In some cases a decision to resect the ulcer may be abandoned at the time of operation because other pathology is elicited which contraindicates more radical procedure. Disease of the liver or pancreas would fall into this category. Frequently it is advisable to carry out a supplemental vagotomy. Such a decision would be based upon the laboratory findings prior to operation.

3. *Vagotomy.*—Postoperative obstructive complications make vagotomy alone an unsatisfactory procedure for the average patient in a large percentage of cases. Vagotomy is often used as a treatment for a bleeding ulcer at the site of a gastroenterostomy stoma. Also, some doctors feel that it should be used in treating ulcers located high in the cardia. They believe that vagotomy tends to reduce surgical trauma which in this lesion so frequently results in mortality. Following the operation the ulceration can be kept under close clinical and radiological observation. If it fails to respond satisfactorily, a more radical procedure of high gastric resection can be tried.

Inasmuch as vagotomy is a relatively new procedure in the surgical treatment of peptic ulcer, some additional comment concerning it is in order. According to Necheles[2] approximately 99 per cent of the beneficial results obtained from vagotomy are due to the reduction of motor effects in the stomach and duodenum; pain is abolished and the ulcer is given a chance to heal. The gastric acid level is not always affected by the operation. Nevertheless clinical results have been considered for the most part satisfactory. It appears, then, that reduction of motility rather than reduction of acid secretion is the chief advantage of vagotomy.

It is contended by some, particularly Necheles,[2] that the so-called complete vagotomy is never complete and that this is a fortunate circumstance. Necheles points out that vagus fibers innervate the lower three quarters of the esophagus, that they reach into the mucosa, the muscularis, and submucosal plexuses and make synaptic connection with the ganglionic cells of the intrinsic parasympathetic plexus. Reinhoff[34] has shown that fibers of the vagus nerves enter the sympathetic chain in the cervical region, travel in the chain to the celiac plexus, and then are distributed to the stomach as parasympathetic fibers. Obviously a complete denervation of the stomach by the Dragstedt procedure,[35] either supradiaphragmatically or infradiaphragmatically, is impossible.

The gastrointestinal tract has two systems of innervation which are generally considered to be antagonistic. The parasympathetic system, which includes the vagus, stimulates the smooth musculature, except for the sphincter; the sympathetic system has the reverse effect. The vagus furnishes parasympathetic innervation as far as the proximal half of the colon. It has been found both clinically and experimentally that section of the vagus results in motor disturbances such as gastric dilatation, delayed emptying of the stomach, and impaired motility of the small bowel. The operation also sharply reduces gastric secretion which the vagus activates. At roentgen examination shortly following vagotomy the stomach and duodenum exhibit a rather marked degree of dilatation, atony, and sluggish peristalsis with delayed gastric evacuation.

Ivy[36] has said that the dog has no ulcers because he does not know the stock market. The vagi are the sole mediators of the cephalic or neurogenic phase of gastric secretion. It was this aspect of the problem which first led Dragstedt to experiment with animals by cutting the vagus nerves.[37] It has now been shown that the secretory response of the stomach to histamine is greatly reduced following vagotomy.

Vaughan[37] has reported the following preoperative and postoperative findings relative to gastric acidity in thirty-three cases of vagotomy: Preoperatively the volume of night secretions averaged 576.7 cc. Postoperatively the average volume was only 336.7 cc. The free acidity of gastric contents was found to average 53.6 preoperatively and 3.3 postoperatively. Thirty

of the thirty-three cases had no free acidity postoperatively. In the insulin test (Hollander) 64.2 was the free acidity average before operation and 1.7 was the average following operation. The two significant complications which presented themselves following vagotomy were gastric stasis and diarrhea.

Gastric stasis may be noted 12 to 24 hours following barium ingestion. Patients with stasis complain of sour eructations, bloating, and inability to gain weight. Gastric stasis and diarrhea usually diminish in severity within a few weeks following surgery and disappear completely within 6 to 7 months following operative procedure. It is generally conceded that in the presence of peptic ulcer the following constitute major indications for vagotomy: incidence of gastric night secretion, positive Hollander insulin test, and increase in free and total gastric acidity.

CONCLUSIONS

1. The roentgen evaluation of peptic ulcer is probably the most reliable and conclusive diagnostic procedure available today in this disease.

2. Its accuracy is directly proportionate to the experience, ability, and conscientious thoroughness of the examiner.

3. In those cases of peptic ulcer requiring surgical intervention, the selection of the type of surgery to be done and the experience and capabilities of the surgeon definitely determine the results of such procedure.

4. Although it is not within the province of the roentgenologist to determine which surgical procedure should be carried out, he should be thoroughly conversant with the various types of surgical treatment for peptic ulcer and their complications.

5. Only by integrating the knowledge and experience of the roentgenologist and the surgeon through consultation can maximum service be offered to the patient suffering from peptic ulcer.

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Recent Advances in Atomic Medicine

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When the first atomic bomb was exploded in 1945 the scientific world realized at once the importance of radioactivity and radioisotopes. An investigation was immediately started relative to health physics, radiation injuries, the use of radioisotopes as tracers, the development of diagnostic materials for various types of diseases, especially cancer, and the use of radioactive elements for treatment of disease. The major portion of this work has been done at the National Research Laboratory of the Atomic Energy Commission in Oak Ridge, Tennessee.

It is now realized that radioactive isotopes are the greatest tool that has been given to the scientific world since the discovery of the microscope. Scientists are now able to investigate physiological and pathological problems with an ease and accuracy never before known. Radioactive and stable isotope tracers permit observations of the mechanisms, reactions, and pathways of elements and compounds in the body. By following the radioactive material in the body or body secretions by means of Geiger tubes and counters, it is now possible to check, both quantitatively and qualitatively, the fundamental life processes and the metabolism of various elements in the body. Such accuracy has never been known before. It is possible to use an amount of tracer so small that the breakdown and the repair metabolism of a single nucleus can be checked. The amount of radioactive material usually required for tracer and diagnostic use is small and most of it can be employed safely in the normal body with no gross harm or permanent damage.

If isotopes are to be used in medicine, they must meet the following exacting requirements:[1]

1. They must be nontoxic in the dosage required and be free from toxic impurities or daughter elements.

2. They must not localize strongly in areas other than those to be treated or diagnosed.

3. They must have a short half life so that the radiation will not persist beyond the desired period. The same result is achieved if the biologic half life—the period that the isotopes remain in the body—is brief.

4. Their half life must be sufficient to permit conversion to useful forms and transportation to the site of administration or to the part to be treated or checked. The maximum desirable half life is between 10 and 15 days; the workable minimum is 12 hours.

5. They must be capable of intensive and economical preparation if they are to achieve therapeutic or diagnostic usefulness; today that means production in an atomic pile.

It is interesting to note that of the 750 isotopes known today, approximately five meet the highest standard of requirements. However, if one is willing to make certain allowances this number can be increased to approximately twenty-two. Hahn and Sheppard[1] presented the basic work along these lines. When they first outlined the above requirements they made a startling statement to the effect that had radium been discovered recently and evaluated in the light of the above requirements, it would never have been used in the treatment of a single tumor.

Most eligible and acceptable isotopes on the basis of the above requirements are: sodium 24 (Na^{24}), half life 14.8 hours, beta radiation 1.39 mev., gamma radiation 2.75 mev.; phosphorus 32 (P^{32}), half life 14 days, beta radiation 1.69 mev., no gamma radiation; potassium (K^{42}), half life 12.4 hours, beta radiation 3.6 mev., gamma radiation 1.5 mev.; iodine 131 (I^{131}), half life 8 days, beta radiation .59 mev., gamma radiation .37 mev.; bromine 82 (BR^{82}), half life 34 hours, beta radiation .46 mev., gamma radiation 1.3 mev.; and gold (AU^{198}), half life 2.8 days, beta radiation .97 mev., gamma radiation .44 mev.

Half life refers to the period of disintegration of a radioactive element and is the time it takes for the radioactivity to decrease 50 per cent. The safe period for disposal of a radioactive element is ten times its half life. For example, iodine 131, with a half life of 8 days, can safely be disposed after approximately 80 days.

There are two types of tracer experiments. When the amount of a tagged element in a tissue or fluid is measured it is called a quantitative type of tracer experiment. When a Geiger counter is used as the detector or measuring device to follow an isotope wherever it goes in whatever form it takes it is called a qualitative type of tracer experiment.

In the space available it will be impossible to discuss all the radioactive isotopes and their advances in medicine, so I will describe only the newer proved uses and applications of radioisotopes as they pertain to medicine.

Phosphorus 32 has been subjected to careful and extensive clinical research and its place has been reasonably well established. The pioneering work was done by Lawrence, Scott, and Tuttle[2] at the University of California and by Low-Beer.[3] Their studies have proved that P^{32} is a valuable agent in the treatment of polycythemia vera and chronic myelogenous leukemia, and that it is of no value in the treatment of Hodgkin's Disease, lymphosarcoma, and acute leukemia.

Phosphorus 32 has definitely become established in the treatment of polycythemia vera.[4] The intravenous administration of a single dose of from 3 to 7 millicuries of P^{32} is sufficient to produce satisfactory remission in 25 per cent of the cases. Hall and Watkins[5] believe that the second dose should be withheld for 8 weeks, after which time second and third injections may be given provided the blood picture does not fall below certain standards. Blood volume and hematocrit determination are important when the patient is under this type of therapy. Following the injection of P^{32} symptomatic relief, characterized by remission in the abnormal blood picture and reduction in the size of the liver and spleen, is at times most marked. Patients are usually restored to normal, useful life. Phosphorus 32 is now thought to be just as important in the treatment of polycythemia vera as insulin is in the treatment and salvage of a diabetic patient. Following a single effective dose the response will usually last from 6 to 12 months. Satisfactory response is

usually produced in 85 per cent of the patients treated and a partial remission or response is produced in the remaining 15 per cent. At this time it is difficult to say whether P^{32} gives a longer survival period than x-ray or other experimental measures. However, it may be well to summarize the various reports by pointing out that of 36 patients 32 survived more than 5 years and 29 more than 10 years.

Chief advantages of phosphorus 32 over x-ray are: (1) the ease of administration, (2) the absence of radiation sickness and other toxicity, and (3) the simplicity with which the dose can be controlled. The disadvantages are: (1) the possibility of bone marrow damage by overdosage and (2) the possibility of a slightly greater incidence of acute leukemia. The possibility of overdosage is of less importance today, however, since adequate and simple assay procedures have been established. When phosphorus 32 is given intravenously to normal persons, from 10 to 25 per cent is excreted in the first 7 days.

In the treatment of chronic leukemia and such allied disease phosphorus 32 has undergone extensive investigation and clinical use.[6,7,8] Doses of from 5 to 7 millicuries have been employed in order to obtain maximal depressant effect on leukopoiesis and minimal effect on formation of erythrocytes and platelets. A group of Chicago workers use an initial dose of from 5 to 7 millicuries and weekly sustaining doses of about 2½ millicuries as determined by excretion studies. The dosages employed above have been found to give maximum therapeutic effect with a minimum of disturbance to the blood picture. The advantages of P^{32} over x-ray therapy in the treatment of chronic myelogenous leukemia are the same as those enumerated earlier. However, phosphorus treatment seems to be no more successful in producing remission and prolongation of life than conventional x-ray therapy.

Low-Beer[9] has done a great deal of clinical work using P^{32} on blotting paper of definite size. The paper is dried and applied directly to the skin. Approximately 400 skin lesions, including carcinoma, hyperkeratosis, warts, and hemangiomas, have been treated in this way after experimental studies. Over 90 per cent of the lesions treated disappeared. P^{32} is used to label red blood cells and to determine blood volume. It is also employed in localizing tumors, especially lesions on or beneath the skin such as breast tumors, and has been particularly valuable in the differential diagnosis of inflammation, benign tumors, and malignant tumors.[10]

Iodine 131 is being used extensively today for the diagnosis and treatment of thyroid diseases. In the diagnosis of hyperthyroidism tracer doses of from 25 to 100 microcuries will show an uptake in 24 hours of approximately 50 per cent in the thyroid patient as compared to an uptake of from 10 to 20 per cent in the normal patient. The measurements can be made directly and very easily by means of a Geiger counter tube which is specific for the gamma radiation given off by the radioactive iodine over the neck in the region of the thyroid gland. A newer trend is toward studying the actual conversion to protein-bound thyroxine. Hypothyroid patients give a 10 per cent conversion, hyperthyroid always over 50 per cent, and toxic over 90 per cent.

In the treatment of hyperthyroidism larger amounts—3 to 5 millicuries—are needed. This gives a radiation equivalent to some 15,000 roentgens per gram of thyroid tissue. Clarke and LeRoy,[11] at the University of Chicago, advise use of iodine 131 in preference to surgery (1) in cases of recurrent hyperthyroidism, (2) in the presence of other pathology making the patient a poor surgical risk, (3) in instances of propylthiouracil failures, (4) in individuals over 45 years of age, and (5) in people who want it. Feitelberg and his coworkers[12] have just presented an encouraging report of a 2½ year study covering over 300 patients. In this series the average dose of radioactive iodine was 8.2 millicuries; the maximum dose was 11 millicuries. The average patient showed subjective improvement in from 2 to 3 weeks and objective improvement in from 4 to 8 weeks. Patients who were not well at the end of the eighth week received a second dose; very few required a third dose. It is interesting to note that no radiation sickness was observed in any of these cases. To quote a sentence from their report: "Because of the simplicity of the method, the absence of important complications, and the excellence of results, it is our opinion that the use of internal radiation with Iodine 131 is a treatment of choice in diffuse toxic goiter."

Thyroid tumors do not respond as well to radioactive iodine as was previously assumed, since only 15 to 25 per cent of these tumors will take up enough radioactive iodine to be of value for its radiation effect. However, a number of successful cases have been recorded and others are now undergoing the treatment. Further report will be forthcoming on this subject.

I have already noted the use of phosphorus 32 in the original and differential diagnosis of mammary tumors. The same group also reported on the use of phosphorus 32 in diagnosis of testicular tumors. At present the greatest interest is in the diagnosis of brain tumors and tumors of the spinal cord.[13] If surgery is utilized first a small tracer dose of phosphorus 32 can be injected into the vein and a special small probe which contains a Geiger tube can be used to follow the limits of the tumor as it is being removed. This technic assures the eradication of the entire tumor structure. However, this procedure is not as popular as the diagnosis and localization of brain tumors using tetraiodofluorescein which contains a radioactive radical of iodine 132. By using this material measurements can be made outside the skull independent of operative procedure. A very selective special tube having a very small opening and a lead shield is used in localizing the lesion. The tracer dose of iodine is perfectly harmless and is excreted in the urine and feces within 2 or 3 days (the length of its biologic half life).

The following procedure is now recommended by the users of this material. A solution containing 1 to 1.2 millicuries of iodine 131 activity, or about 1 cc., is given intravenously. The Geiger tube shows a response at the site of tumor within 15 to 30 minutes and becomes very critical from that time up to 2 hours. Measured externally on the skull with a one inch tube opening the counting rate may approach 1000 to 1200 counts per minute. At or just before the maximum time is reached within the 2 hour period, measurements are made at some thirty other predetermined locations around the skull. Corresponding areas on opposite sides are measured alternately and results compared. The differential between such corresponding areas, the one normal and the other containing a tumor, will be from 80 to 100 counts per minute. Values smaller than 50 counts per minute are of doubtful significance. Between the second and third

hours the values will gradually decline but a differential will still persist.

In the summer of 1950 at the American Neurological Society, the Hines Veteran's Hospital Group of Chicago presented a formal report on more than 200 cases of brain tumor localization done with the use of tetraiodofluorescein. An accuracy between 92 and 94 per cent was recorded. Because of its accuracy this procedure apparently has become the method of choice. Upper spinal cord tumors may be similarly localized by the same material; however, the closer one gets to the liver the less accurate the localization will become. The men at Hines state that the position and size of the tumor can be definitely determined and an estimate made of its malignant nature. Such accuracy and success probably is due to the close cooperation between the isotopologist and the neurosurgeon, working separately and together to recheck the areas involved. There appears to be no question that such a painless diagnostic test will grow in value and become increasingly more important as better detection equipment becomes available.

Gallium is being extensively studied by Dudley, Munn, and Henry[14] at the Naval Research Hospital in the diagnosis and treatment of bone tumors.

The tagging of human serum albumin with radioactive iodine 131 has proved to be a very simple, speedy, and accurate method of studying blood volumes in the human being. The original work in this field was done by Hahn[1] in dogs and animals using radioactive iron.

Sodium 24 has become important as an aid in the diagnosis of peripheral vascular disease and in the determination of circulation time. The original work dates back to 1942; however, more extensive work is being done at the present time and further developments in the use of this element will be forthcoming.

Since 1949 radiocardiography has become increasingly important. In a study of 400 patients made by Prinzmetal and his associates[15] a dose of from 0.1 to 0.2 millicurie of sodium 24 was given intravenously as rapidly as possible. A Geiger tube was placed over the right side of the heart until an audible count was reached. Five to 6 seconds later a second peak indicated that the flow was through the left chamber of the heart and the Geiger was moved. An electrocardiographic tracing can be made simultaneously with this procedure. Radiocardiography is particularly useful in differentiating heart disease from conditions simulating cardiac insufficiency. Further research is in progress.

Radiocolloids have become very important and Hahn and his group[16] have made the most extensive clinical application along these lines using colloidal hydroxide, manganese dioxide, and colloidal gold. Colloidal gold, which is tagged with radioactive gold 198 (Au^{198}) with a half life of 2.7 days and a biologic effect on the body for 2 to 3 weeks, has been used in the treatment of tumors. Treatments have been given to 268 patients using a total of 13,200 millicuries or the equivalent of 13 grams of radium. Most of these patients have been in terminal stages where improvement was hardly to be expected. The results have been very encouraging since radioactive gold can be injected directly into accessible tumor tissue in the same manner that one might implant radon seeds and the gold will remain in the tumor and not be absorbed by the blood stream. The dose is usually 0.6 millicuries of gold per gram of tissue. As much as 50 to 70 millicuries have been given to one tumor at a single sitting.

Amounts equivalent to 50,000 roentgens per gram of tissue are usually necessary to eradicate a tumor. Extensive studies, both by animal experimentation and by clinical trials in humans, are being carried on today in many institutions to prove that colloidal gold will remain in tumors. Some of the injected tumors have been shown to retain 95 to 100 per cent of the material over a biologic period of 2 to 3 weeks. In advanced ovarian tumors with ascites, colloidal gold has been given intraperitoneally with marked reduction of the recurrence of ascites and in many cases a decrease in the size of tumor metastases in the peritoneal cavity. This has proved to be of great importance in the palliation of these terminal cases. Sarcomas have also shown a favorable response when injected with colloidal gold. Nodes which fail to react to radiation therapy apparently will respond to injected colloidal gold. When colloidal gold is given intravenously, it is chiefly deposited in the liver and spleen. It is therefore thought that it may have some value in reticuloendothelial malignancies.

Some cases of gastric carcinoma and malignant tumors of the bladder have been treated with solutions of cobalt 60 salts and radioactive gold in colloidal solution. The stomach was prepared by previous surgery and the bladder by transplantation of ureters.

CONCLUSION

I have attempted to summarize briefly the new advances in atomic medicine. The use of radioactive isotopes as tracers, diagnostic agents, and therapeutic agents has opened a door to science and medicine which will become more and more important as clinical evaluation and experimentation become more conclusive. Radiologists should be aware of these important changes so that they can encourage hospitals and teaching colleges to incorporate facilities for the use of these materials in their research programs, diagnostic evaluations, and therapeutic uses.

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Pitfalls in Pediatric Diagnosis

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Pitfalls in pediatric diagnosis by x-ray are usually the result of an incomplete understanding of the normal anatomic and physiologic characteristics peculiar to the immature individual. Unless the diagnostician has the facilities of a large hospital or an extensive pediatrics practice at his disposal, he not uncommonly tries to interpret radiographs of infants and children in the more common light of adult anatomy. Time and effort are necessary to become familiar with the atypical patterns of skeletal and soft tissue shadows presented by the pediatric patient at various ages.

Another important factor in this problem is the dearth of modern textbooks on the subject. There were no books on pediatric roentgen diagnosis published in the English language from the time Rotch's[1] classical "Roentgen Rays in Pediatrics" appeared in 1910 until the fairly recent "Pediatric X-ray Diagnosis" by Caffey,[2] an excellent reference work which no one doing x-ray diagnosis should be without.

It is not my purpose at this time to go into an exhaustive treatise on adolescent roentgenology or to review conditions which are almost identical with those found in the adult, but rather to point out the normal anatomy of the child, show the important conditions peculiar to the child patient, and attempt to describe the roentgen anatomy and outline the differential diagnostic points.

THE SKULL

Most of us are familiar with the infant and juvenile skull and have little or no difficulty in checking the usual closure times of the sutures from birth to the age of 2 years. However, the rather uncommon persistence of the metopic suture can easily be mistaken for a vertical fracture of the frontal bone, especially if a history of trauma is presented.

The typical hydrocephalic skull is usually the result of an internal hydrocephalus; the external type does not always show gross enlargement of the head. Ventriculography must of course be used to establish a definite roentgen diagnosis. The lacunar skull or Lückenschädel, an anomaly of the calvarium, may be associated with meningocele or spina bifida. However, it is not always the result of increased intracranial pressure and, when not associated with other major defects, the prognosis is good. The rather unusual anencephalic monster can sometimes be diagnosed from the maternal pelvic films which are usually taken to determine the cause of uterine inertia which is nearly always present in these cases.

THE PARANASAL SINUSES

A point which frequently confuses general practitioners and even some pediatricians, concerns the time of the appearance and pneumatization of the paranasal air sinuses and mastoid cells. In general it can be said that the maxillary and ethmoid sinuses are present at birth but they cannot be considered completely pneumatized until the eleventh year. The frontal sinuses become visible as upper ethmoid cells from 2 to 6 years of age and reach the upper orbital rim level at 8 years. The sphenoid sinus begins to aerate during the third or fourth year of life.

THE MASTOID ANTRA

The mastoid antra can be seen at 4 months and begins to pneumatize at about 6 months. It is more accurate to refer to inflammatory changes in this region, which are almost inevitably secondary to otitis media, as a petrositis of the temporal bone rather than as a mastoiditis. This condition, even after 6 months of age, is difficult to diagnose, particularly when bilateral in nature.

THE CHEST

A frequent source of confusion, insofar as chest radiography in the infant is concerned, is the thymus gland. Being situated in the upper anterior mediastinum, it produces a widened supracardiac shadow when enlarged. Normally the supracardiac shadow becomes distended at the peak of the expiratory phase of respiration. Thymic films, therefore, ideally should be made at the peak of inspiration and with the child in repose as crying also widens the mediastinal shadow. Thymic hyperplasia may produce variations in the width and contour of the mediastinal shadow, showing at times a unilateral or bilateral notched or nodular silhouette. The importance of an enlarged thymus gland should be judged by the accompanying symptoms or upon the degree of tracheal displacement or compression. The latter deformity is best demonstrated in lateral projections and also during the inspiratory phase of respiration.

Primary childhood tuberculosis must be differentiated on the x-ray film from a lobar pneumonia which in the early stages it simulates quite closely. The enlarged hilar drainage glands present in both conditions tend to regress along with the peripheral infiltration lesion in pneumonia but will persist for some time in tuberculous infection, even after the pulmonary focus appears healed. The picture in miliary tuberculosis is quite characteristic and not confusing.

The normal juvenile heart is relatively large in relation to the chest when compared with the adult heart, a factor which must be borne in mind when attempting to evaluate cardiac enlargement. Congenital heart pathologies and their diagnosis have come

to the forefront of recent years since the advent of intrathoracic vascular surgery. Although these cardiac defects are best demonstrated by angiocardiography, they may nevertheless be suspected from plain film radiography and fluoroscopic examination of the chest.

Coarctation of the aorta shows a sharp contracture of the aortic arch just distal to the obliterated ductus arteriosus with dilatation of the ascending aorta and the innominate and subclavian arteries. Interventricular septal defect is a rather common anomaly which when large results in a right-sided cardiac enlargement and dilatation of the pulmonary artery. Interatrial septal defect or patency of the foramen ovale gives a picture of right heart enlargement, pulmonary artery prominence with a conspicuous aortic arch, and a marked increase in the bronchovascular pattern. Patent ductus arteriosus produces a similar pattern but without the gross cardiac enlargement seen in the interatrial defect; the most significant finding is the enlargement of the pulmonary artery and its branches. The tetrad of Fallot with its pulmonary stenosis, dextroposition of the aorta, interventricular septal defect and hypertrophy of the right ventricle is a common and important congenital heart disease.

GASTROINTESTINAL TRACT AND ABDOMEN

The gastrointestinal tract and abdomen present characteristic findings in the child. The liver, like the heart, is normally large in relation to the abdominal cavity. In the newborn the liver takes up about two-fifths of the abdominal capacity. Congenital esophageal atresia, with its not unusual complication of aspiration pneumonia, can be shown quite well following the attempted ingestion of a barium "loaded" formula. Pyloric stenosis gives a characteristic picture of gastric dilatation and slowed stomach emptying time.

Hirschsprung's disease increases the capacity of the colon enormously. Several quarts of barium suspension may be necessary to fill the colon by enema. Oral administration of contrast medium is contraindicated because of the danger of further impaction.

Intussusception, in which the bowel is telescoped into itself, produces a characteristic filling defect caused by the invagination. Imperforate anus can be diagnosed radiographically by anteroposterior and lateral views of the pelvis with the infant inverted. Normally present gas within the colon will rise and indicate the thickness of the septum separating the rectum and perineal cutaneous surface which in turn will determine the best approach to plastic surgical repair.

URINARY TRACT

The urinary system, except for congenital anomalies, is probaably of major concern, insofar as childhood pathology is concerned, as a point of origin of Wilm's tumor, an embryoma arising from fetal rests within the kidney and characterized by rapid and massive hyperplasia and dramatic response to radiation therapy. Renal rickets, actually the result of chronic interstitial nephritis, can produce a picture of parenchymal nephrocalcinosis, a finding which argues for Albright's theory of hyperparathyroidism as an etiologic factor.

THE EXTREMITIES

The extremities with their variable epiphyseal and ossification centers can present a problem, especially when there is a traumatic history present. A helpful procedure for the uninitiated is to have on hand, for comparison studies, known normal radiographs of the common extremity joints and their related structures. Contralateral films are also helpful in ruling out so-called normal variations, and to check the relative position of similar epiphyses on the unaffected side.

In the very young the radiotranslucency of the unossified ends of the long bones must be borne in mind as it is possible for one of these "invisible" epiphyses to be fractured or displaced with no x-ray evidence. The diagnosis in these cases frequently, of necessity, must be made on palpation and inspection.

Extremity anomalies can be of a generalized nature as exemplified by achondrodystrophic dwarfism, multiple cartilaginous exostoses, chondromatosis, and generalized multiple osteogenesis imperfecta. Localized anomalies of the extremities are not too common; they can take the form of aplastic, hyperplastic, or supernumerary digits and the localized form of osteogenesis imperfecta which includes the osteochondrodystrophy of Madelung and other bizarre growth disturbances. Aseptic necrosis of bone or osteochondrosis juvenilis is best demonstrated in the extremities as Köhler's disease of the tarsal navicular but can also be present as Osgood-Schlatter's disease at the tibial tubercle or Freiberg's infraction of the second metatarsal head.

In asymptomatic calcanei, the posterior apophysis may be increased in density and even fragmented without being pathologic and, in the absence of pain and tenderness locally, must be considered as an anatomic variant. Accessory ossification centers in the tarsal region must not be mistaken for ununited fracture fragments.

The deficiency diseases are best demonstrated in the bones of the lower extremities. Scurvy presents a "ground-glass" appearance of the spongiosa and evidence of hemorrhage under the epiphyseal plates and the periosteum. Rickets, now rather infrequently seen in this country since the advent of vitamin D prophylaxis, when healed can leave a permanent scarring at the metaphyseal line. Irregular mineralization on the medial margins of the distal femoral ossification centers in a normal finding in some children.

Congenital syphilis is frequently overlooked until radiography of a painful tibia will reveal the characteristic early sabershin due to chronic subperiosteal new bone formation. The tumors of bone in the extremities are represented in children by the highly malignant osteogenic sarcoma which is usually found about the knee. The x-ray appearance is variable and its clinical signs can simulate simple hematoma in this region. Giant-cell tumor seems to have a predilection for the epiphyseal areas of long bones and is found almost exclusively in children. It is benign in character and is typically multilocular in appearance. It can result in pathologic fracture.

THE SPINE

The spine is a common site for anomalies which are usually multiple. In the cervical region are found the fused or "blockvertebra" of the Klippel-Feil syndrome causing short neck and limited head motions. Sacralization of the fifth lumbar segment in various degrees is a common anomaly. Scheuermann's adolescent kyphosis usually begins as a vertebral epiphysitis and heals with a variable degree of anterior body notching deformity. Tuberculous spondylitis, the commonest of vertebral infections in the child, is characteristically limited to the bodies rather than the neural arches with a relatively early destruction of the intervertebral disk spaces.

THE PELVIS

The pelvis is a common and important location for pediatric problems, especially important because of the danger of permanent deformity from undiagnosed and untreated pathologies. In the realm of the osteochondritides Legg-Perthes' disease in both the early and late phases must be considered as well as ischiopubic osteochondritis which produces only a slight swelling of the synchondrosis but definite symptoms of regional pain and impaired locomotion. This condition can frequently be overlooked on the x-ray film in the early stage. Congenital hip dislocation is self-evident on the radiograph and should present no diagnostic problem. Slipped femoral capital epiphysis must be borne in mind when dealing with hip injuries in the pediatric patient, as prompt treatment is mandatory if deformity in later life is to be avoided. Pelvic bone tumors are exemplified by the benign osteoclastoma and the highly malignant Ewing's sarcoma or endothelioma which must be differentiated from osteomyelitis, a particularly difficult procedure in the pelvic bones.

CONCLUSION

An attempt has been made to highlight some of the diseases which are characteristic of the pediatric patient. There is great need of a wider knowledge of the anatomic and physiologic peculiarities of the growing infant and child, which can be demonstrated on radiographic examination.

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Tumors of the Anterior Mediastinum

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The entire content of the chest lies in the mediastinum, except the lungs and the pleura. The space is bounded anteriorly by the sternum, posteriorly by the spine, laterally by the parietal pleura, inferiorly by the diaphragm, and superiorly by the thoracic inlet on a level of the manubrium and the first dorsal vertebra. Division of the mediastinum into anterior and posterior spaces is due largely to the heart and great vessels which occupy the middle mediastinum. Briefly stated, the anterior space contains glandular structures; the middle, vascular; and in the posterior space are found structures of neurogenic origin. Hence, tumors of the mediastinum include, in large measure, tumors of glandular, vascular, or nerve tissues.

Primary tumors may be either benign or malignant. According to some authorities, the ratio is approximately two benign to one malignant. Metastatic tumors of this area are more frequent than primary neoplasms.[1] All mediastinal tumors are potentially malignant in the opinion of Harrington.[2] If a neoplasm has been present more than a year, it is probably benign.[3] Secondary mediastinal neoplasms may be either carcinomatous or sarcomatous.[3] No roentgenological characteristics differentiate these tumors.

TERATOID TUMORS

The most common tumor of the anterior mediastinum is of embryonic or branchial origin—the teratoid.[1] These are tumors of adulthood, with exceptions. They are usually cystic in nature and lined by stratified squamous, cuboid, or columnar epithelium. They comprise dermoids, epidermoids, and teratomata. A positive Aschheim-Zondek test in the absence of pregnancy or testicular pathology is corroborative of their presence.[4]

The content of the teratoids is usually cystic, often with a fluid level of floating fat, or with cloudy fluid or grumous material on section, but some (the dermoids) may contain hair, bone, cartilage, teeth, or other anatomical structures. Solid tumors, although less frequent, are prone to become malignant.

Most teratomata are benign, but a few are malignant. Out of 245 cases reviewed by Laipply,[5] twenty-eight or 11 per cent were malignant. Because of the varied structures present, any portion of the teratoid may become malignant, usually an epidermoid malignancy, while the remainder continues benign. Metastasis may extend to regional structures or, by pressure, erode into the pleura or bronchi.

Roentgenograms in the posteroanterior and lateral projections reveal a large, circular, clean-cut, well-delineated encapsulated density beneath the sternum, varying enormously in size and appearing anterior to the pericardium and great vessels. It may be irregular and homogenous, often quite opaque, and frequently with calcified margins, or, as before mentioned, it may contain varied fragments of anatomical structures.

LYMPHOMAS

The second most common tumors of the anterior mediastinum are the lymphomas. These include Hodgkin's disease (lymphadenoma, lymphogranuloma), lymphosarcomas, and lymphatic leukemias. All are neoplasms of glands which are impossible to differentiate clinically, probably histologically, according to Rubin.[4]

Presence of Sternberg-Reed giant cells in Hodgkin's disease is perhaps of value in determining its presence if a peripheral lymphadenopathy is biopsied. This finding is usually considered of dependable diagnostic value. Some authorities contend that the disease originates in the mediastinal glands; others disagree, assigning glandular structure in no particular anatomical area as the primary seat of origin. No organ or tissue of the body is immune to involvement by this disease. It gives rise to lymphatic hyperplasia, fibrosis, ulceration, or cavitation, depending upon the nature and location of the anatomical part. Failure to displace thoracic structures is said to be character-

istic. Lymphoma is a disease of adulthood, although it is occasionally found in children. Sex is not a significant factor in relation to incidence.

The roentgenologist, in the x-ray film, sees lymphomas as rounded densities, usually appearing bilaterally. Often discrete, well-rounded, well-delineated masses are evident or lobulated and clustered fused masses may appear. The complex structures are often lymphosarcoma, while the simpler structure is pathognomonic of Hodgkin's disease. It is impossible to differentiate radiographically between mediastinal Hodgkin's disease and lymphosarcoma.[4]

All lymphomas are regarded radiosensitive. Therefore, deep irradiation is considered an indispensable therapeutic procedure in the management of these tumors, even though it is regarded at best as only palliative. Irradiation is also a definite diagnostic aid in differentiating radiosensitive from radioresistant neoplasms.[6]

THYMIC ENLARGEMENTS AND TUMORS

The third most common tumors of the mediastinum are neoplasms and enlargements of the thymus gland. These tumors originate from lymphoid tissue or reticular epithelium of the entoderm of the third or fourth branchial arches or clefts, or there may be an admixture of tissues forming a lymphoepitheliomic type, which is frequently malignant.

Three types of thymic tumors are recognized:[4]

1. Lymphosarcoma, which occurs mostly in males under 40 or in children
2. Leukosarcoma, associated with leukemia
3. Thymoma, often carcinomatous and peculiar to ages from 50 to 70 years, usually benign between ages of 20 to 40 years.

Thymic neoplasms may be simple hyperplasia of the thymic structures as seen in the very young or tumors as above described. The simple hyperplastic thymus, or persistent thymus, as it is often captioned, is usually seen in the first 6 months of the infant's life and is accompanied by respiratory symptoms. There may be striking variations in size.

Malignant neoplasms of the thymus usually involve pleura, pericardium, even the heart muscle, and, by metastasis, may reach the lungs and other organs. Invasion of the sternum is not uncommon. The carcinomas are often encapsulated and lobulated and are characterized by a rapid evolution. Not infrequently carcinoma and sarcoma coexist in thymic tumors.

Patterns of thymic neoplasms are varied. They are triangular, columnar, or globular in shape. Simple infantile hyperplasias are often flat, sometimes defying recognition in the lateral projection. According to Caffey,[7] the proverbial broadened shadow in the upper thorax may not be thymic structure. The "notch" between the thymic hyperplasia and the heart is a significant diagnostic factor if present.

Pressure symptoms from an enlarged thymus gland play a minor, if not negligible, role in the genesis of respiratory and other manifestations, according to some authorities. Others recognize that thymus compression of the trachea may result in stenosis of that structure. The studies of Hammar and Boyd[8] conclude that the close relationship between hyperplasia of the thymus and sudden unexplained death has been completely refuted. Often an unrecognized cardiac lesion is the causative factor, according to their findings.

Radiographic examination should be made in as definite posteroanterior projection as possible with patient in erect position and during full inspiration. The target-patient distance should be sufficient to obviate distortion. If thymic hyperplasia is present, narrowing of the tracheal air column is evident at the thoracic inlet on lateral views.

Radiographically, malignant thymomas are nonpulsating, sharply delineated, more or less rounded, often asymmetrical tumors, situated in the superior aspect of the anterior mediastinum.[3]

Both malignant and benign thymic tumors are nonsurgical but radiosensitive; later they become radioresistant.[9] Kaplan[6] states that treatment may be by either surgery or irradiation or both, with high surgical mortality. Irradiation dosage in thymomas must be much higher than is usually indicated in benign hyperplasias for complete regression or even prolonged palliation.

INTRATHORACIC GOITERS

Intrathoracic goiter may occur either as an extension from the cervical gland or from aberrant cell rests. Lahey[10] believes that the most common type of intrathoracic goiter originates from a discrete adenoma of the lower pole of the thyroid which descends into the thorax where it continues to enlarge, often forming the typical dumbbell type. Next to discrete adenomas, Lahey found multiple colloid adenomatous goiter, especially of the endemic type, to be the second most common to become intrathoracic.

Aberrant thyroid tissue may result from benign metastasis from the thyroid or cellular anlage of thyroid tissue, which may later become part of a teratoma. Ectopic thyroid tissue may undergo pathological changes similar to normal gland.

Diagnosis of intrathoracic goiter is made upon evidence of obstruction of superior mediastinum and roentgen examination. The tumor is usually asymmetrical, the right side averaging the larger. The radiographic density is considerable, with convex borders, sometimes pyramidal in shape with smooth margins that are well defined. It is high in the thorax and descends upon deglutition. It frequently displaces and compresses the trachea. Growth may lead to compression of the aortic arch. Calcification may occur. At times it is confused with aortic aneurysm.[10] It is radioresistant.

Malignant degeneration of the discrete thyroid adenoma may occur. It remains within its fibrous capsule, and is completely removable.

LIPOMAS

From connective tissue are derived the lipoma, fibroma, xanthoma, chondroma, chondrosarcoma, and sarcoma. The names themselves suggest the tissues involved. All are rare tumors, and discussion of only one type—the lipomas—will suffice for this brief presentation.

Mediastinal lipomas occur infrequently. They are well-defined neoplasms usually occurring in the anterior mediastinum. According to Heuer,[11] about two-thirds are limited to the mediastinum, the remainder extending into the neck forming the dumbbell type. These lesions are rarely malignant, although liposarcoma is not unknown. They are semisolid in consistency, often having the same radiodensity as the other fat of the body, and vary enormously in size, attaining unbelievable dimensions at times. The cardiac impulse may be transmitted by these tumors. Radiographically, because of the consistency, the opacity is greatest centrally to graduate into zones of lesser

density toward the periphery. Occasionally they are confused with cysts.[4]

SARCOIDOSIS

Sarcoidosis is characterized by multiple involvement of lymph nodes of the hilum and mediastinum. The glands are lobulated and smooth in outline. They can not be distinguished from lymphoblastomas.[3] Multiple paratracheal node enlargement with reticular infiltrations into both lung fields suggests the diagnosis. Irradiation therapy is of doubtful value in this type of neoplasm.

CONDITIONS INVOLVING MEDIASTINAL LYMPH NODES

Among other rare conditions involving the anterior mediastinal glands are myelogenous leukemia, mycosis fungoides, and giant follicular lymphoblastoma. In myelogenous leukemia, enlargement of the mediastinal and hilar glands is demonstrated roentgenographically in only 9.6 per cent of cases, according to Vieta and Craver,[12] although 47 per cent show enlargement at autopsy.

In mycosis fungoides, approximately 10 per cent of cases show roentgen evidence of involvement of mediastinal and hilar lymph nodes. Radiographic differential diagnosis is not possible. Biopsy and clinical evaluation are necessary to establish identification.[5]

In giant follicular lymphoblastoma, the glands are discrete, rubbery, and vary greatly in size. Absence of subjective symptoms is characteristic. It is found at all age levels, but is more common past the third decade. Males are more frequently involved than females. The condition is often confused radiographically with lymphatic leukemia and Hodgkin's disease. Diagnosis is dependent upon biopsy of a lymph node.[3]

METASTATIC TUMORS OF THE ANTERIOR MEDIASTINUM

Tumors originating in certain anatomical structures of the body may metastasize into the anterior mediastinum. Chief among these neoplasms are those that arise in the malignant breast, the ovary, the thyroid, the kidney, and the testicle. Bronchogenic carcinoma may extrude into this area. All involve the lymph glands.

Testicular seminomas reach the anterior mediastinal lymph nodes through the lymphatics, while teratocarcinoma, trophocarcinoma, and chorioepithelioma invade the superior mediastinum via the bloodstream. All are radiosensitive.

Thyroid cancer metastasizes in the lungs by way of the anterior mediastinum and cervical lymph glands, while hypernephroma (clear cell carcinoma or Grawitz' tumor) originating from renal rather than adrenal structures often reach large dimensions in the invaded mediastinal lymph glands.[9] Both types of malignancies are moderately radiosensitive, according to our own experience, which is confirmed by Portmann,[9] Kaplan,[6] and others.

Radiographic diagnosis is soundly aided by a proper history. On the basis of roentgenological appearance alone, in the absence of the history and collateral evidence, differential recognition is scarcely possible; with it, diagnosis is often relatively simple.

SUMMARY

1. A brief presentation has been made of tumors of the anterior mediastinum, including teratoid tumors, lymphoma, thymus tumors, intrathoracic goiter, lipoma, sarcoidosis, and certain others.

2. All are tumors referrable to glandular structure.

3. Both benign and malignant tumors occur, and both types often coexist within the same structure.

4. Radiographic studies are essential to identification.

5. Radiosensitivity is extremely variable.

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RADIATION IN SKIN CONDITIONS

Skin conditions were among the earliest lesions for which irradiation was employed. Both x-rays and radium were used in the early days following the discovery of these modalities. The therapeutic use of x-ray and radium was initiated under circumstances almost accidental in character, but fortunately associated with men of scientific ability and keen observation. It was through the recognition of these biologic effects by these observers that irradiation received the stimulus which led to its use for therapeutic purposes in the treatment of human disease.

The employment of irradiation in treating diseases of the skin was initiated by (1) the harmful action of x-rays on the skin of the hands of early workers with these rays; (2) the unexpected skin burn produced by radium, carried on the person of Becquerel.—Ira I. Kaplan, Clinical radiation therapy, page 130.

Current Medical Literature

THE INCIDENCE OF MALIGNANCY IN GASTRIC ULCERS BELIEVED PREOPERATIVELY TO BE BENIGN

For many years both internists and surgeons have been disturbed by the fact that they are frequently unable to differentiate benign from malignant gastric ulcerations. Elmer Graham Lampert, M.D., and others, writing in *Surgery, Gynecology and Obstetrics,* December, 1950, present a study of the clinical and pathologic findings on a group of 73 such indistinguishable cases, in which a diagnosis of benign gastric ulcer had been made and which proved pathologically to be malignant. These cases were selected from a group of 550 patients all of whom had been diagnosed as having benign ulcerating lesions of the stomach. The incidence of improperly diagnosed cases in this series was thus 13 per cent.

The authors present their findings in detail, comparing them with results of other studies. A summary of the results of this series is as follows: Average age at onset of symptoms was 49 years, and average age at time of operation was 52 years. Sixty per cent had epigastric pain of classic peptic ulcer type, and 28.7 per cent had distress of many years' duration. Gastric hemorrhage occurred in 28.7 per cent of the cases. In 65 per cent of the cases on whom the test was made (66 out of the 73) the amount of free hydrochloric acid in the gastric contents was within normal limits. Nine cases were studied gastroscopically, and in every instance the results were misleading. Of the 73 cases 21.9 per cent had associated duodenal ulcer. The findings in microscopic gradings of the lesions corresponded closely with those of any group of gastric ulcers; 87.5 per cent of the lesions were located on or near the lesser curvature; and over 75 per cent of the lesions were 4 cm. or less in diameter. Nine patients were treated conservatively at some time prior to operation, and all had shown signs of improvement. Operability rate in this series was 100 per cent, and resectability rate was 82 per cent, much higher than usual because of the method of selection of cases. Of the 69 patients for whom follow-up records were available, 43.5 per cent lived 5 years or more after operation.

From these results it can be seen that in a definite percentage of cases there is no method of diagnosing malignancy short of pathologic examination of tissues removed surgically, which casts a bleak light on the practice of temporizing in the case of a gastric ulcer.

HEADACHE AND HEAD PAIN OF OCULAR ORIGIN

In looking over the medical records of 200 patients, A. D. Ruedemann, M.D., writing in the October 14, 1950, issue of the *Journal of the American Medical Association,* found that approximately 25 per cent of the patients gave headache as the initial reason for seeking medical aid. Moreover, Ruedemann states, about 25 per cent of all headaches are of ocular origin.

Unilateral head pains are caused by such ocular abnormalities as ciliary spasm, localized neuralgia, single muscle spasm, inflammation of the gasserian ganglion, and irritation of the internal carotid artery by an aneurysm. Malocclusion of the temporomandibular joint and localized virus disease along nerve trunks are also important factors. Unilateral headaches can also be traced to more obscure causes. Two patients who came to the author with severe unilateral headaches were eventually found to have low grade iritis with posterior synechia and increased intraocular pressure, respectively.

Glaucoma, although a rare disease, is another possible cause of headache. In its early stages this disease is frequently hard to diagnose. The author suggests that all inflamed and painful eyes be considered glaucomatous until proved otherwise. Occasionally it is necessary to advise the removal of blind or dead eyes to relieve unexplained head pain even though the intraocular tension appears normal.

Bilateral pain, which may be frontal, vertical, bitemporal, occipital, suboccipital, or over the tip of the mastoid process, may also be of ocular origin. In many instances glasses are not the answer to the problem. Possible explanations for such headaches include abuse of the eyes, errors in refraction, ocular muscle imbalance, and such debilitating processes as thyroid or parathyroid deficiency.

Farsighted people, particularly those who do close work, frequently suffer moderate to severe frontal headaches. Glasses used therapeutically rather than as an aid to vision are suggested. Errors in refraction usually result in frontal, vertical, or bitemporal pain. Dizziness and sometimes nausea are associated symptoms. Rest usually offers relief. When refraction errors are combined with muscle imbalance the problem becomes more serious. A thorough eye examination is necessary to determine the type and extent of muscle error. The ocular musculature may be faulty, poor, or inadequate. Resulting pain is often found along the superior or inferior nuchal lines or at the tip of the mastoid process. Neck pain is another frequent symptom. Gastric disturbances may also be traced to ocular muscle imbalance in certain instances. Exercises, surgical treatment, glasses, or all three may be necessary to correct the error.

General disease is sometimes responsible for ocular pain. Unstable eye musculature is frequently noted in persons suffering physical debilities and exhaustion of ocular muscles is common in persons in menopause or suffering cerebral disturbance. Glandular disturbances also result in muscle instability causing headache. Many patients do not realize that they have ocular muscle imbalance. Sometimes the condition can be improved or corrected by doing eye exercises or wearing glasses during the period of debility.

Determining the cause of headaches is very important. Many headaches have a simple explanation; others, however, are forerunners of a serious intracranial disease. The patient's history is very important in determining whether the cause is organic or functional. The doctor should find out the exact location of the pain, the measures required for relief, the length of time the eyes are used, and the type of work they are used for. Kenneth C. Swan points out in a discussion of Ruedemann's paper that if an ophthalmologic examination is indicated, it should be thorough and complete. Too frequently patients are sent for a brief examination to rule out the eyes as a basis of headache. Such a determination cannot be made by a cursory examination.

BRONCHIAL ASTHMA DUE TO ALLERGY TO TOBACCO SMOKE IN AN INFANT

An unusual instance of a 1-year-old child developing bronchial asthma due to an allergy to tobacco smoke is reported by Frank L. Rosen, M.D., and Anna Levy, M.D., in the October 21, 1950, issue of *The Journal of the American Medical Association.*

For the past 6 months the baby had been subject to severe coughing and sneezing spells. His eyes were watery and he had a nasal discharge. At 10 months the infant had experienced a definite asthmatic attack which recurred at 11 months and again at 12 months. Intracutaneous allergy tests made by the passive transfer method using the father as test subject showed moderate positive reactions to tobacco, kapok, and milk, and marked positive reactions to dust and banana.

When the parents were questioned about their smoking habits the mother admitted that she smoked incessantly, even when feeding and diapering the baby. It was suggested that all smoking be prohibited in the house. With the cessation of smoking the baby's symptoms cleared completely. The symptoms did not recur until 18 months later when the mother again began smoking. She immediately stopped and the child's condition returned to normal.

DERMATITIS IN INDUSTRY

More working time is lost because of industrial dermatoses than because of any other occupational disease. Also, a great many cases of dermatoses go undetected because they are not severe enough to cause work stoppage. Louis Schwartz, M.D., presents a consideration of the problem of occupational dermatitis in the December, 1950, issue of *American Practitioner.*

Predisposing causes of occupational dermatitis are lack of cleanliness, both of the worker and of the workroom; excessive perspiration; the existence of other dermatoses or skin abnormalities; and, to a lesser degree, allergy. Physical causes are heat, both dry and wet, electricity (which results in burns); and roentgen and solar radiation. Chemical causes include primary irritants, which affect everyone when used in sufficient amounts and for long enough periods, and sensitizers, which affect only sensitized individuals. A dermatitis resulting from a primary irritant is often followed by sensitization of the sufferer so that he reacts to weaker dilutions that previously would not have irritated him, and that have no effect on normal individuals. Cuts and abrasions which can become infected, pressure, and friction are mechanical causes of dermatoses in industry.

The symptoms of a dermatitis due to hypersensitivity or to concentrated irritants are, first, a sudden onset of pruritus of the exposed parts, followed by erythema, papules, blisters, edema, oozing, and crusting. These symptoms may develop at any time from a few hours to several days after contact with the irritant. Certain specific substances result in more characteristic symptoms, such as the melanosis typical of exposure to petroleum products. Chronic exposure to mild irritants results in thickening of the skin and loss of elasticity, with eventual chronic, fissured eczema.

Diagnosis of occupational dermatosis must be based on a history of onset of symptoms during a period of industrial exposure; on the site of eruptions, which, with occupational dermatoses is usually on the exposed parts first, then on places where friction exists; and on the appearance of the lesions. Differential diagnosis is sometimes difficult for the general practitioner or industrial physician, and it must be remembered that the existence of other skin conditions often predisposes to an occupational dermatitis. Patch tests are often of value in determining the cause of the dermatitis. Two important tenets which should be kept in mind in diagnosing a dermatitis in a worker are, first, that an occupational dermatitis almost invariably appears while the person is at work or shortly after, improves when he stops working for a period, and recurs when he returns to work; and second, that a dermatitis which does not improve after two months' absence from work is not an occupational dermatitis.

Treatment consists of applying only the mildest lotions during the moist stages, and the mildest ointments during the dry stages. Chemical burns are treated like other burns after immersing the affected part in water to remove the offending substance. Ulcers resulting from corrosives are curetted and then covered with aseptic dressings.

Much can be done in the way of prevention. This should begin in the pre-employment period, with careful examination of the applicant and notation of all pathologic skin conditions. Applicants with skin eruptions should not be employed where there is a marked skin hazard; those with a tendency to dry skin should not be given work involving the use of defatting agents; and applicants for work with acne-producing substances should be checked for sites of existing acne before beginning work. Patch testing applicants is inadvisable, since an allergy will not exist until the individual comes in contact with an irritant; and the patch test may be the sensitizing factor.

Other preventive measures which should be taken by industries include efficient ventilation of workrooms; protective clothing such as gloves, sleeves, aprons, hoods, and coveralls (those made from synthetic resin films have been found to be best); protective ointments for the face and hands, which, while low on the list, are often preferred by the workers themselves; and cleanliness, not only of workers, but also of their clothes, and of the machines and workrooms. This last is by far the most important protective measure. All surfaces, tools, et cetera, on which irritants may possibly be deposited should be cleaned daily. Particular attention should be paid to the cleansing agents used by the workers, since many cases of dermatitis are caused by the cleansers used. Usually these need not be strong. When it is necessary to use a cleanser reinforced with alkali, emollient creams should be provided for use afterwards to replace the fat removed from the skin by the strong cleanser. Workers with sensitive skins or with dermatoses should use one of the soapless cleansers with a pH of 7 or less.

PRINCIPLES AND TECHNICS OF PROTEIN THERAPY IN SURGICAL PATIENTS

In the October, 1950, issue of *Surgery, Gynecology and Obstetrics,* Jameson L. Chassin, M.D., discusses various principles and technics for handling protein depletion in patients about to undergo a major operation. After reading the basic literature Chassin concludes that while the need for protein therapy is recognized by all, the methods of repletion are varied and often contradictory. As a result many misconceptions prevail in the minds of surgical practitioners regarding protein therapy.

Whenever possible protein deficiencies should be restored prior to operation. Parenteral administration of protein hydrolysates following operation does not compensate for inadequate preoperative nutritional repletion. To determine the extent of protein depletion certain factors should receive close attention. Changes in the clinical history and appearance of the patient are sound guideposts. Excessive weight loss, particularly in the nonobese person, indicates protein depletion. Other manifestations of hypoproteinism (a term coined to designate protein depletion of the tissues as well as of the blood) include: lowered resistance to loss of blood; increased susceptibility to shock; decreased antibody production; lowered resistance to infection; impairment of wound healing; bone atrophy; liver dysfunction; anemia; hypoalbuminemia; diminished tissue proteins; edema; weakness, lassitude, mental depression, etc.; and a low pulse and basal metabolic rate and low blood pressure. A subnormal serum protein level is also a good indication of protein depletion. However, methods for determining plasma volume are frequently so inaccurate and inconsistent that laboratory tests should be used only as a last resort.

Causes of hypoproteinism can be divided into four classifications: lack of protein metabolites, excessive loss of protein metabolites, increased need for protein, and metabolic dysfunction.

The National Research Council's recommended daily protein intake of 1 gram per kilogram of body weight for maintenance of health in a normal person is inadequate to produce the positive nitrogen balance necessary to restore the debilitated patient, according to the author. Experiments have shown that in general protein is utilized by the depleted organism in direct proportion to the dose administered. Benditt and his coworkers state that from 2 to 4 grams of protein per kilogram of weight must be taken daily by the debilitated patient if a good rate of tissue synthesis is to be obtained.

Various repletion technics involving the use of whole protein, protein hydrolysate, plasma, albumin, and whole blood are reviewed. Either oral or parenteral routes can be used in protein repletion programs although more efficient protein utilization is achieved by the oral route. The following program of protein therapy is suggested by the author. For best results each program should be designed to meet the specific needs of the individual patient.

Evaluation of the patient and his disease is the first step and should include a dietary history and a record of recent weight loss. In some cases a determination of serum protein and albumin concentrations is necessary. A blood count should always be taken. Hospital care is recommended for those patients whose hemoglobin level is below 10 grams per cent; otherwise most repletion programs can be started at home with the patient following a properly planned diet with supplementary protein and vitamin therapy. Under proper

guidance a cooperative home patient should be able to ingest from 200 to 250 grams of protein daily. Hospital care is similar to home care except that the parenteral route is also available. The length of repletion therapy varies. Varco recommends from 5 to 7 days for each 10 per cent of body weight lost. The author believes that the weight curve provides a good gauge to successful nutritional therapy.

Following operation all lost blood should be replaced. In an uncomplicated case of gastric or colonic resection the patient should be able to eat a soft diet by the end of the third or fifth day. If oral feeding is impossible then parenteral protein therapy is indicated. Early ambulation is recommended as it accelerates the return of the gastrointestinal tract to normal function. The author particularly urges early ambulation for the older age group.

EFFECTS OF ANTIMICROBIAL AGENTS ON THE TUBERCLE BACILLUS AND ON EXPERIMENTAL TUBERCULOSIS

William Steenken, Jr., M.D., and Emanuel Wolinsky, M.D., report in the November, 1950, issue of the *American Journal of Medicine* the effects of various antibiotic and chemotherapeutic substances which have demonstrated some promise against the tubercle bacillus in vitro and in animal experiments.

Streptomycin.—Streptomycin, administered intramuscularly, was found to be the most constantly effective agent against tuberculosis in infected guinea pigs. In adequate doses streptomycin will eradicate all gross evidence of disease except local abscesses at the site of inoculation and perhaps in the contiguous lymph nodes. However, when the abscesses rupture spontaneously or are drained surgically, healing is likely to occur. No significant difference was noted between the effect of the drug when administered in divided daily doses and when given in a single dose. Streptomycin, given however early, will not prevent dissemination of the inoculated bacilli from the local site. It is only after hypersensitivity and necrosis appear that the course becomes regressive. The major drawback to streptomycin is the development of resistant strains. Also, streptomycin failed to produce in chronic types of tuberculosis the same uniformly excellent effect it produced in acute types of the disease.

Para-Aminosalicylic Acid (PAS).—Although rather favorable results have been reported previously on the effectiveness of PAS, the authors report poor results in their laboratory. When given alone the drug failed to produce any significant effect on the course of tuberculosis in guinea pigs and it was found that the organisms developed resistance quite rapidly.

Streptomycin Para-Aminosalicylate.—By combining streptomycin with PAS to form a water-soluble salt a somewhat better result was obtained than when streptomycin was given alone. It is felt that an even more effective method is to administer streptomycin intramuscularly in conjunction with a full dose of PAS given orally.

Neomycin.—Neomycin demonstrated itself to be a potent antituberculous agent both in vitro and in the experimental animal. In the guinea pig it was less active than streptomycin. With further purification it is hoped that the drug will show greater effectiveness and less toxicity.

Thiosemicarbazones.—Tibione (TB-1) produced a definite retardation of the tuberculosis process; however, it is only about half as effective as streptomycin although more effective than PAS. At present the application of TB-1 is restricted because of its marked toxicity. Other members of this group are being investigated and perhaps a less toxic and more efficient antituberculosis agent will be forthcoming.

Sulfones.—Promin, diasone, promizole, and other such drugs are included in this heading. According to Smith and his coworkers, who have done extensive research using the sulfones, the effect of sulfones is limited in animals because "The tuberculostatic activity of the sulfones thus far studied is too low in relation to the tolerated concentration that can be maintained in the blood and tissues of experimental animals, to produce complete eradication of tuberculous infections." In the future one of these compounds may be developed which will be an important adjunct when administered along with streptomycin or some other powerful antibiotic agent.

Subtilin.—The authors were unable to demonstrate any effect from the maximal tolerated dose of subtilin on tubercular guinea pigs.

Streptothricin and Streptothricin VI.—Although these two drugs have a fairly good tuberculostatic action in vitro their extreme toxicity makes them unsatisfactory for treatment of experimental animals.

Aureomycin.—This drug, too, produces a definite inhibitory effect on the growth of tubercle bacilli in the test tube but this effect is interfered with by the presence of serum and no beneficial in vivo result has occurred either in experimental animals or in humans.

Chloromycetin.—Chloromycetin appears to be of no value as an antituberculosis agent.

Penicillin.—Even massive doses of penicillin have little effect on the course of tuberculous disease.

Ortho-Aminophenol.—This drug has been described by Japanese workers as having good antituberculosis properties. Experiments in this laboratory offered very little promise.

Terramycin.—Both tuberculous guinea pigs and mice showed a definite beneficial response following treatment with terramycin but further study, particularly in humans, must be performed before any definite statements can be made. It was interesting to note that streptomycin-resistant organisms were affected by terramycin. Toxic reaction to terramycin was very high in the guinea pig but this reaction does not occur in humans.

Viomycin.—In high enough dosage viomycin produced beneficial effects comparable to those seen with streptomycin. It was relatively nontoxic and effective against streptomycin-resistant organisms. Toxic properties in humans are now under investigation.

MORTON TERRY, B.A., D.O., M.Sc. (Ost.)

ANTIMICROBIAL THERAPY IN HUMAN TUBERCULOSIS

The present day approach to therapy of tuberculosis is reviewed by H. Corwin Hinshaw, M.D., in the November, 1950, issue of the *American Journal of Medicine*. The value of prolonged bed rest, collapse therapy, and pulmonary resection is pointed out. The author suggests that antimicrobial therapy be used as a supplement to rather than a substitute for the aforementioned methods.

Promizole, promin, neomycin, viomycin, terramycin, and the thiosemicarbazones (tibione) are discussed and the author feels that insufficient clinical research has been reported to date to recommend these agents for clinical use.

The agents of choice remain at present streptomycin and para-aminosalicylic acid (PAS). For patients of average weight the proved effective dose of streptomycin is 1.0 gram per day. Toxicity with this dose is moderate or negligible in most cases. When the clinical situation is desperate, as in cases of miliary tuberculosis, tuberculous meningitis, and so forth, 2.0 grams per day should be used. Temporary or permanent disturbance of the vestibular functions of the eighth cranial nerve must be expected and the risk assumed. The total daily dose may be given at one time. Dihydrostreptomycin is of value when larger doses are being employed as it is somewhat less toxic.

PAS is most useful under the following circumstances: (1) to serve as an auxiliary agent to streptomycin, the two being given simultaneously; (2) in streptomycin-resistant cases of tuberculosis; and (3) as a substitute for streptomycin when the physician anticipates a great need for streptomycin at a future date, for instance in a case of planned pulmonary resection, et cetera. Most patients will tolerate 12 grams daily when divided into three or four doses and taken with meals. If 15 to 20 grams daily are tolerated without excessive gastric distress, then the larger dose can be considered advantageous.

Drug-resistant bacilli appear more rarely and at a much later date when streptomycin-PAS therapy is given. Longer and more effective therapy for pulmonary tuberculosis may thus be obtained.

MORTON TERRY, B.A., D.O., M.Sc. (Ost.)

Book Notices

RADIUM THERAPY. By C. W. Wilson, M.Sc., Ph.D., F.Inst.P., Physicist in the Department of X-Ray and Radium Therapy, Westminster Hospital. Second Impression. Cloth. Pp. 224, with illustrations. Price $6.00. The Sherwood Press, Box 1551, Main P.O., Washington 13, 1948.

Written for postgraduate students of radiology, workers in radiotherapy, and physicists, this book is far too technical to be of interest to the general practitioner, or even to the novice in radium therapy. Beginning with a general discussion of the nature of radium, its properties and application to medicine, the author covers the field of radium therapy completely, from explanations of the interactions of high voltage radiation, the theory and methods of measuring gamma ray dosage, apparatus for measuring gamma ray dosage, through radium therapy with surface applicators, cavitary and interstitial radium therapy, radium teletherapy, to the protection of the therapist. An appendix is given, which includes a table showing decay of radon and equivalent dose, a table of integrals of value in the calculation of dosage, the inverse square law table, and formulae for calculation of areas and volumes in surface and interstitial therapy. An excellent bibliography is given at the end of each chapter.

Considering the advanced level of the book as a whole, it is surprising that the author has considered it necessary to include as elementary an explanation of the nature of radium as he has written. It would seem that anyone who could comprehend the rest of the book would surely have learned this already. It may be of value, however, for review purposes.

The author is a physicist who is well aware of the problems that beset the workers in the field of radium therapy. He possesses a thorough knowledge of the field, and presents his information in a clear and detailed manner that is particularly valuable in the handling of so difficult a subject. The practising radium therapist should find this a most convenient reference book.

PHYSICAL EXAMINATION IN HEALTH AND DISEASE. By Rudolph H. Kampmeier, A.B., M.D., Associate Professor of Medicine, Vanderbilt University School of Medicine; Visiting Physician to Vanderbilt University Hospital; Chief of the Medical Outpatient Service, Vanderbilt University Hospital, Nashville, Tennessee. Cloth. Pp. 814, with illustrations. Price $8.00. F. A. Davis Company, 1914 Cherry St., Philadelphia 3, 1950.

Regardless of the number of mechanical aids the doctor has at hand, history taking and physical examination still remain the principal diagnostic procedures, according to Kampmeier. "The more skilled [the doctor] is in these two fundamental approaches," the author states in his introduction, "the more pointed is his employment of diagnostic aids and special methods of examination, and thus the more brilliant will be his diagnoses and employment of therapeutic measures."

Because such training must begin at the undergraduate level, Kampmeier has designed this textbook to present in the clearest, most coherent way possible the fundamentals of physical diagnosis. He has succeeded admirably. He has not allowed himself to drift into the field of clinical medicine but has limited himself strictly to the technics of history taking, observation, palpation, percussion, and auscultation.

The book has several other points to recommend it. Kampmeier believes that most third year medical students have an inadequate medical vocabulary. He therefore has included many different technical terms and synonyms to familiarize the student with medical terminology. Because such questions are so frequently asked in the classroom, the author has also tried to give the reason—whether anatomic, physiologic, or pathologic—for physical manifestations when the cause is not obvious.

Kampmeier has introduced another innovation in the arrangement of his material. Most textbooks lump methods of examination and normal and abnormal findings together in one chapter. In this book two chapters are devoted to each body region (head; neck; breast, chest; heart and blood vessels; abdomen; genitalia, perineum, anus, and rectum; and musculoskeletal system and extremities). The first of these chapters gives the technic of examination plus a description of the normal and its variations. Abnormal findings are presented in the second chapter. Also, "In the chapters describing the abnormal findings, especially those of the heart and lungs, an effort has been made to relate these to pathologic changes."

Kampmeier also believes that illustrative material is very important in helping the student to remember, consequently he has included over 500 exceptionally good black and white photographs of different disease conditions. X-rays are used to illustrate pulmonary infiltration. In cases of malignant disease the author has used photographs of early stages rather than more advanced stages in order to teach the student to associate carcinoma "with early, minimal changes and not with advanced lesions which any lay person may diagnose."

In addition to the chapters on specific body areas, Kampmeier has included a chapter on the case history; William F. Orr has contributed a chapter on the body in action; and there are two chapters of a general survey nature covering constitution and stature, symmetry, weight and nutrition, posture and gait, speech, psyche, skin, and temperature in normal and abnormal states. Short bibliographies are included at the end of each chapter.

Although this book was written specifically for the student, it will be of interest to any doctor who wants to brush up on his technic of physical examination.

SURGERY OF THE SHOULDER. By A. F. DePalma, M.D., James Edwards Professor of Orthopedic Surgery and Head of the Department, Jefferson Medical College, Philadelphia; Attending Orthopedic Surgeon, Jefferson Medical College Hospital, Philadelphia; Attending Orthopedic Surgeon, Methodist Episcopal Hospital, Philadelphia; Attending Orthopedic Surgeon, St. Agnes Hospital, Philadelphia. Cloth. Pp. 438, with illustrations. Price $17.50. J. B. Lippincott Company, East Washington Square, Philadelphia, 1950.

"The writing of this book has been prompted by the desire to assemble under one cover the accumulated knowledge on the anatomy and the physiology of the shoulder and some of the more common entities responsible for dysfunction of the shoulder," states the author in his preface. DePalma has also performed a great service by presenting his observations on anatomic variations and degenerative lesions of the inner surface of the scapulohumeral joint appearing in successive age groups. From this information it has been possible to formulate norms for different age ranges and consequently to comprehend better the various pathologic processes involving the musculotendinous cuff and the biceps tendon which often result in impairment of function.

DePalma begins his book—which, incidentally, is in no way limited to surgery of the shoulder—with a chapter on the origin and comparative anatomy of the pectoral girdle and upper extremities. He next describes the normal anatomy and functional mechanism of the shoulder joint as a basis for future comparison. Certain congenital abnormalities are also included in this chapter. The main body of the book is devoted to a thorough study of variational anatomy and degenerative lesions of the shoulder. joint, ruptures of the musculotendinous cuff, frozen shoulder and bicipital syndrome, calcareous tendinitis of the musculotendinous cuff, dislocations of the shoulder joint, fractures and fracture-dislocations of the upper end of the humerus, shoulder pain of neurogenic origin, obstetric paralysis, and bone tumors of the shoulder joint. The last chapter discusses various surgical approaches and procedures.

Contrary to the opinion held by many orthopedists, DePalma emphasizes a close relationship between frozen shoul-

der and bicipital tenosynovitis. To support his belief the author offers extensive data obtained from clinical investigation of 83 cases, 56 of which were seen during surgery. He admits, however, that this is by no means the last word. But he hopes that "sufficient interest will be aroused to stimulate further investigation which will either support or disprove the interpretation of the observations made in this chapter."

This is indeed a worthwhile book for both practitioner and surgeon. It is certainly one of the most complete books on the more common pathologic conditions affecting the shoulder region. Excellent photographs and original drawings by C. Brill accompany the text. The type face is large and easy to read and the paper is heavy and durable. Osteopathic physicians particularly will find this book a valuable addition to their library.

FUNCTIONAL HUMAN ANATOMY. By Cleveland S. Simkins, A.B., Ph.D., Professor of Anatomy, Creighton School of Medicine. Cloth. Pp. 593, with illustrations. Price $12.00. Wm. C. Brown Company, 915 Main St., Dubuque, Iowa, 1949.

This book, according to its author, was written for the beginning student of medicine and for the purpose of creating "the impression that structure (anatomy) and function (physiology) have no separate existence in time or space." It is essentially a teaching manual which attempts to explain rather than to describe the units of the human structure so that the student can acquire basic knowledge upon which he may build in accordance with his developing needs. This book was not designed to replace laboratory manuals or the standard anatomy texts, but to supplement them and to facilitate their use.

The book is arranged in six sections, each dealing with one of the six sections into which the body has, for convenience, been divided. Section I deals with the upper extremity, Section II with the head and neck, Section III with the thorax, Section IV with the abdomen, Section V with the pelvis, and Section VI with the lower extremity.

This manual seems likely to serve the purpose for which it was intended; its approach and manner of presentation are clear and fresh and should lead to understanding and retention on the part of the student. The book would have profited greatly from adequate editorial handling and proofreading. Errors in grammar, spelling, and typing often distract the reader's attention from the worth-while subject matter of the book.

ESSENTIALS OF MEDICINE. The Basis of Nursing Care. By Charles Phillips Emerson, Jr., A.B., M.D., Associate Professor of Medicine, Boston University School of Medicine; Member, Robert Dawson Evans Memorial Laboratory; Visiting Physician and Physician in Charge of Clinical Laboratories, Massachusetts Memorial Hospitals; Attending Physician, Cushing Veterans Administration Hospital, and Medical Consultant, American Red Cross, and Jane Elizabeth Taylor, R.N., B.S., M. ED., Lecturer, Frances Payne Bolton School of Nursing, Western Reserve University; Formerly Nursing Education Consultant, U.S. Public Health Service; Formerly Assistant Professor of Medical Nursing, Yale University School of Nursing; and Assistant in Charge of Medical Nursing, New Haven Hospital. Ed. 16, revised and reset. Cloth. Pp. 815, with illustrations. Price $4.00. J. B. Lippincott Company, East Washington Square, Philadelphia, 1950.

This is the sixteenth edition of a well known book that first made its appearance in 1908 under the authorship of Dr. Emerson. The book was originally intended to provide "a clear, if limited, idea of a subject" to medical students and nurses who "know a great deal in a general, indefinite, inaccurate way" but "seldom have a clear, sharp mental picture of the elements of a subject." Time and new discoveries in the medical field have greatly widened the horizon of the professional nurse, but she still has need for "a clear idea of a subject," and this book gives it to her.

In this edition increased emphasis has been placed upon treatment of the patient. Recognition has also been given to the growing interest among doctors and laymen in the sociologic aspects of disease and in the widespread development of preventive medicine.

Specific revisions made in this edition include four new chapters on the theoretical and practical aspects of medical and nursing care. The chapter entitled Treatment of the Patient: the Therapeutic Program is an innovation in that treatment is outlined as applied to particular situations rather than to specific diseases. This chapter also discusses the influence of such factors as age of patient, duration of illness, and gravity of prognosis, upon the conduct of treatment. In the other three new chapters the authors discuss various therapeutic measures such as dietetics, parenteral hydration, and psychotherapy, that have particular importance in relation to symptomatic and supportive treatment. This inclusion is justified by the fact that today, as never before, the nurse is actively participating in the application of therapeutic technics.

Among the typographical features of the book are the almost 200 illustrations including some original cartoons which graphically describe therapeutic measures for specific conditions. Unfortunately the type face is small but this is compensated for by the narrow column width which encourages rapid reading. A handy list of medical combining forms, suffixes and prefixes, appears inside the hard covers of the book.

FREUD: DICTIONARY OF PSYCHOANALYSIS. Edited by Nandor Fodor, Associate of the Association for the Advancement of Psychotherapy, and Frank Gaynor, Co-Author of the "Dictionary of Industrial Psychology." Cloth. Pp. 208. Price $3.75. Philosophical Library, Inc., 15 East 40th Street, New York, 1950.

This is an unusual book. It is composed entirely of quotations from the various works of Freud and constitutes an attempt on the part of the editors to present as explicitly as possible Freud's own meaning of the words and concepts he developed. However, it is not a dictionary in the commonly understood sense of that word. Unless the reader already has some understanding of psychoanalysis and a "feel" for it, this book will be of no use to him. In many instances the collection of words that follows a term in no way constitutes a definition of that term; in other instances the definition given is unintelligible to the uninitiated because of the terminology involved, and some of this terminology is not even defined elsewhere in the book. Thus it is obvious that the neophyte will find this book exasperating, to say the least.

So much for the bad side of the ledger. There is also much to say on the good side. For those who already do have some understanding of psychiatry or abnormal psychology it is indeed of value. They will find here, for the most part, clear expositions of Freud's basic ideas and concepts. The fact will be brought home to them time and time again that Freud wrote with a simplicity and a perspicuity that could well be copied by today's writers in the field. It will also be of value to them in conjunction with other works on psychoanalysis—as Reik says in his introduction, "Such a dictionary is, of course, not to be used as a textbook of psychoanalysis. It can rather be used to correct many textbooks, now printed."

THE SOCIOLOGY OF THE PATIENT. A Textbook for Nurses. By Earl Lomon Koos, Ph.D., Professor and Chairman, The Department of Sociology in The University of Rochester. Cloth. Pp. 264. Price $3.00. McGraw-Hill Book Company, 330 W. 42nd St., New York, 1950.

Although primarily written for nurses, this textbook rates an unqualified recommendation to all persons who are interested in people who are sick, rather than patients or diseases as such. Starting with "The Patient is a Person," Koos maintains an understandable continuity of thought through discussion of the usual sociological fundamentals, culture, personality, family, social groups, health and welfare, earning a living, and leisure time activities. However, the book has the advantage of avoiding the usual sociological clichés and overworked methods of approach. One hardly recognizes academic sociology in this human approach.

Continuity with clarity, smoothness without sacrifice of saliency, and completeness without garrulity characterize this fine book.

ARNOLD MELNICK, A.B., M.A., D.O.

Make Hotel Reservations Now!

Fifty-Fifth Annual Convention
American Osteopathic Association

Milwaukee, Wisconsin — July 16 to 20, 1951

Hotel Rates*

See hotel reservation blank on next page

NAME OF HOTEL		SINGLE	DOUBLE	TWIN BEDS
ABBOT CREST	Without Bath	$2.00	$3.00 to 3.50	
	With Bath	3.00	4.50	$4.40 to 5.50
ANTLERS	Without Bath	1.50 to 2.00	3.00	3.00
	With Bath	2.25 to 5.00	3.50 to 6.00	6.00
BELMONT	Without Bath	2.00 and Up	2.50 and Up	3.50 to 4.00
	With Bath	2.50 and Up	3.50 and Up	5.00 to 6.00
CARLTON	Without Bath	1.50 to 2.00	2.50 to 3.00	
	With Bath	2.50 to 3.00	3.50 to 4.00	4.50
EAST WAY	Without Bath			
	With Bath	2.50 to 3.00	3.50 to 4.00	
GLOBE	Without Bath	1.50 to 2.00	3.00 to 4.00	3.00 to 3.50
	With Bath	3.00 to 5.00	4.00 to 5.00	4.00
JUNEAU	Without Bath	1.50 to 2.50	3.00 to 4.00	3.50 to 4.00
	With Bath	3.00 to 3.50	4.00 to 5.00	5.00
KILBOURN	Without Bath	2.25 to 2.50	3.50 to 4.00	
	With Bath	2.75 to 3.50	4.00 to 5.00	6.00 to 7.00
LA SALLE	Without Bath			
	With Bath	3.50 to 5.00	5.00 to 8.00	6.50 to 8.50
MARTIN	Without Bath	2.50 to 3.00	3.00 to 7.50	3.00 to 7.50
	With Bath	3.50 to 5.50	4.50 to 7.50	4.50 to 7.50
MARYLAND	Without Bath	2.50	4.00	
	With Bath	4.00 and Up	5.50 and Up	6.00 and Up
MEDFORD	Without Bath	2.25	3.50 to 4.00	4.50
	With Bath	3.00 to 4.00	4.25 to 5.25	6.00 to 7.00
PFISTER	Without Bath	3.00 to 4.50	5.50 to 7.00	5.50 to 7.00
	With Bath	3.50 to 8.00	6.50 to 10.00	7.00 to 12.00
PLANKINTON HOUSE	Without Bath			
	With Bath	3.50 to 6.00	6.00 to 8.00	6.50 to 9.00
PLAZA	Without Bath			
	With Bath	3.00 to 4.00	4.00 to 6.00	6.50 to 8.00
RANDOLPH	Without Bath	2.25	3.50	
	With Bath	3.00 to 3.25	5.00 to 5.50	6.00 to 6.50
REPUBLICAN	Without Bath	1.75 to 2.50	3.50	3.50
	With Bath	3.50 to 4.50	4.50 to 6.00	5.50 to 6.00
ROYAL	Without Bath	3.00	4.00	
	With Bath	4.00	5.50 to 6.50	6.50
SCHROEDER	Without Bath			
	With Bath	3.75 to 10.00	6.50 to 10.00	8.00 to 12.00
STRATFORD	Without Bath			
	With Bath	3.00 to 5.00	5.00 to 7.50	6.00 to 7.50
TOWER	Without Bath			
	With Bath	4.00 to 5.50	5.50 to 6.50	6.50 to 8.00
TOWNE	Without Bath	2.25 to 2.75	3.50 to 4.00	4.00
	With Bath	3.25 to 3.75	4.50 to 5.50	6.00
WESTGATE	Without Bath	1.75 to 2.50	3.50 to 4.00	
	With Bath	2.75 to 3.75	4.25 to 5.00	5.75 and Up
WISCONSIN	Without Bath	2.50 to 3.00	3.75 to 4.75	
	With Bath	3.50 to 7.50	5.50 to 9.00	7.50 to 10.00

Note: Single rooms are extremely limited in number. You will stand a much better chance of securing accommodations if your request calls for rooms to be occupied by two or more persons.

*Rates listed are subject to change.

Important!

Please read these instructions before filling out the application on the next page.

1. All reservations must be made directly through the A.O.A. Housing Bureau, 611 N. Broadway, Milwaukee 2, Wisconsin. Do not send reservations to the Local Convention Arrangements Committee or to the American Osteopathic Association Central office.

2. All requests for reservations must give the definite date and hour of arrival as well as the definite date and approximate hour of departure. Names and addresses of all persons who will occupy the reservations requested must be included.

3. If you expect to attend any meetings scheduled prior to or after the National Convention itself, these meetings must be listed by name of group and the dates must be given.

Classifications of Eligible Applicants for Hotel Accommodations

Member, Officer or Trustee, Delegate or Alternate, Scientific Exhibitor, Technical Exhibitor

Application for Hotel Accommodations for

AMERICAN OSTEOPATHIC ASSOCIATION CONVENTION

Milwaukee, Wisconsin—July 16 to 20, 1951

See reverse side for instructions and hotel prices

A.O.A. Housing Bureau
611 N. Broadway
Milwaukee 2, Wisconsin

Date.....

Meetings to Be Attended—Be Sure to Check!

Do you plan to attend a meeting to be held prior to National Convention?.....

If so, give name of group..... Dates.....

Do you plan to attend a meeting to be held after National Convention? .....

If so, give name of group..... Dates.....

Accommodations Desired

Choice of Hotels

First Choice.....Second Choice.....Third Choice.....

If the hotels of your choice are unable to accept your reservation, the A.O.A. Housing Bureau will make as good a reservation as possible elsewhere, providing all hotel rooms have not already been taken.

Type of Room

Single Room (with bath).....(without bath).....Double Room (with bath).....

without bath).....Twin Beds (with bath).....(without bath).....

Time of Arrival and Departure

Arriving at Hotel (date)..... hour..... A.M..... P.M.....

Leaving Hotel (date) ..... hour..... A.M..... P.M.....

Guests' Names

The NAME OF EACH HOTEL GUEST MUST BE LISTED. Therefore, please include the name of both persons for each double room or twin bedded room requested. Names and addresses of all persons for whom you are requesting reservations and who will occupy the rooms are as follows:

.....

.....

.....

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Individual Requesting Reservations

Name.....

Address.....

City.....Zone.....State.....

Name of Firm if Technical Exhibitor.....

ALL RESERVATIONS MUST BE RECEIVED PRIOR TO JUNE 20, 1951

Conventions and Meetings

Announcements

American Osteopathic Association, Fifty-Fifth Annual Convention, Milwaukee, July 16-20, inclusive. Program Chairman, Paul Atterberry, Milwaukee.

American College of Neuropsychiatrists, annual meeting, Still-Hildreth Osteopathic Sanatorium, Macon, Mo., July 13, 14. Program Chairman, Cecil Harris, Philadelphia.

American College of Osteopathic Surgeons, annual meeting, Hotel Statler, Washington, D. C., October 28-November 2. Program Chairman, Albert B. Wheeler, Carthage, Mo.

American Osteopathic Society of Proctology, Hotel Durant, Flint, Mich., May 10-12. Program Chairman, John J. Mahannah, Warren, Ohio.

Arizona, annual meeting, Tucson, May 4-6.

Arkansas, annual meeting, Albert Pike Hotel, Little Rock, April 30-May 1. Program Chairman, Edna W. Nies, Blytheville.

California, annual meeting, Long Beach, May 23-25; House of Delegates, May 21-22.

Child Health Conference, Hotel Continental and Municipal Auditorium, Kansas City, Mo., April 16-18.

Florida, annual meeting, Hotel Biltmore, Palm Beach, May 10-12. Program Chairman, Walter W. Markert, Fort Lauderdale.

Georgia, annual meeting, Radium Springs Hotel, Albany, May 4, 5. Program Chairman, Hassie H. Trimble, Jr., Moultrie.

Illinois, annual meeting, Bismarck Hotel, Chicago, May 11-13. Program Chairman, S. V. Robuck, Chicago.

Indiana, annual meeting, Richmond-Leland Hotel, Richmond, May 6-8. Program Chairman, Fred L. Swope, Richmond.

Iowa, annual meeting, Hotel Fort Des Moines, Des Moines, May 14, 15. Program Chairman, Donald C. Giehm, Sioux City.

Kansas, annual meeting, Hotel Kansan, Topeka, April 8-11. Program Chairman, Harvey H. Steffen, Wichita.

Kentucky, annual meeting, Brown Hotel, Louisville, October. Program Chairman, Martha Garnett, Louisville.

Maine, postgraduate seminar, Bangor, April; annual convention, Samoset Hotel, Rockland, June 22-23.

Michigan, annual meeting, Pantlind Hotel, Grand Rapids, October 1-4. Program Chairman, Edward S. Kanter, Detroit.

Missouri, annual meeting, Governor Hotel, Jefferson City, October 23-25. Program Chairman, M. E. Elliott, Chillicothe.

New Jersey, annual meeting, Hotel Stacy Trent, Trenton, March 10-11. Program Chairman, Herbert A. Laidman, Glen Rock.

New York, annual meeting, Hotel Statler, New York City, October 12-13.

North Carolina, annual meeting, Asheville, October 19-20. Program Chairman, Elizabeth E. Smith, Asheville.

North Dakota, annual meeting, Fargo, May. Program Chairman, C. Delward Thompson, Fargo.

Northwest Osteopathic Convention, Portland, Ore., June 4-7. Program Chairman, Harold D. Groves, Portland, Ore.

Ohio, annual meeting, Neil House, Columbus, May 6-9. Program Chairman, Roger E. Bennett, Middletown.

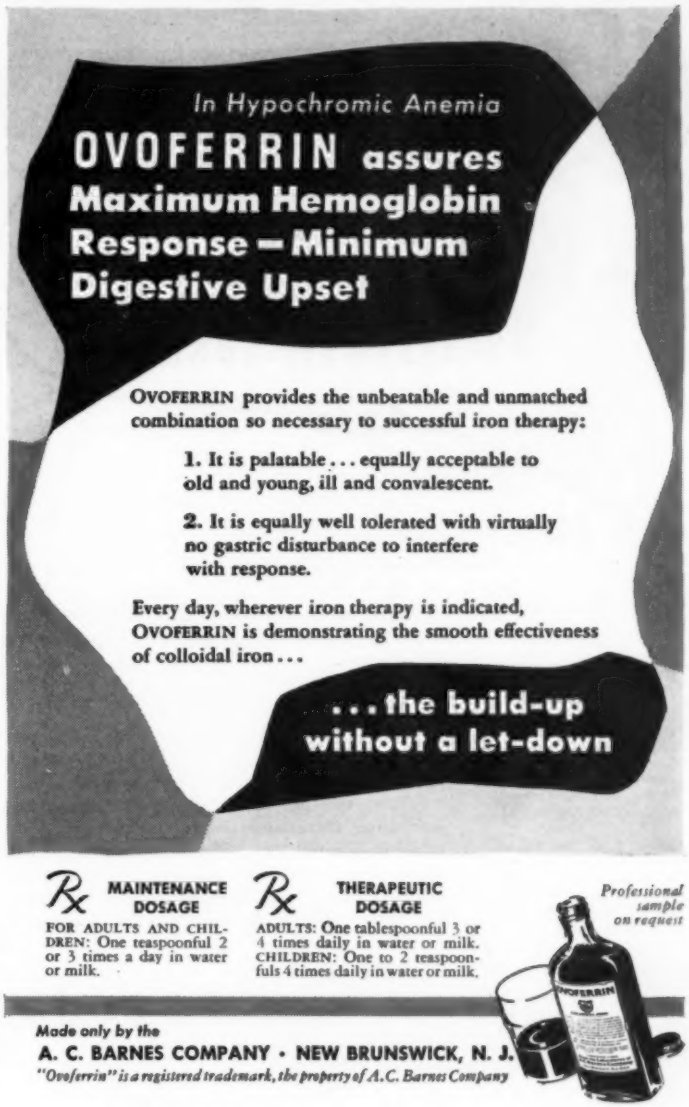
Oklahoma, annual meeting, Hotel Biltmore, Oklahoma City, November 6-8. Program Chairman, P. A. Harris, Oklahoma City.

Ontario, annual meeting, Royal Connaught Hotel, Hamilton, May 3-5. Program Chairman, Norman W. Routledge, Chatham.

Oregon: See Northwest Osteopathic Convention.

Pennsylvania, annual meeting, Penn-Harris Hotel, Harrisburg, September 21-23. Program Chairman, K. T. Steigelman, York.

Rhode Island, annual meeting, Providence, March 7, 8. Program Chairman, William H. Lum, Providence.


In Hypochromic Anemia
OVOFERRIN assures Maximum Hemoglobin Response — Minimum Digestive Upset
OVOFERRIN provides the unbeatable and unmatched combination so necessary to successful iron therapy:
1. It is palatable . . . equally acceptable to old and young, ill and convalescent.
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Every day, wherever iron therapy is indicated, OVOFERRIN is demonstrating the smooth effectiveness of colloidal iron . . .
. . . the build-up without a let-down
℞ MAINTENANCE DOSAGE
FOR ADULTS AND CHILDREN: One teaspoonful 2 or 3 times a day in water or milk.
℞ THERAPEUTIC DOSAGE
ADULTS: One tablespoonful 3 or 4 times daily in water or milk.
CHILDREN: One to 2 teaspoonfuls 4 times daily in water or milk.
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in Coryza and Sinusitis...
Bacitracin-Nasal

CSC

The combined use of a decongestant and bacitracin provides more than symptomatic value in the local treatment of many upper respiratory infections.[1,2] This approach not only improves nasal ventilation, but also aids in reducing the period of infection since many pathogens found in the nose and nasal sinuses are bacitracin-sensitive. Because of the low index of allergenicity of bacitracin, this antibiotic rarely leads to adverse local reactions on topical application.

Bacitracin-Nasal-C.S.C.—containing 250 units of bacitracin per cc. and 0.25% desoxyephedrine in a rose-scented, approximately isotonic aqueous solution—is a practical and convenient means of instituting intranasal bacitracin therapy. It is non-irritant and well tolerated, and its pleasant scent is acceptable to all patients. Bacitracin-Nasal-C.S.C. is indicated in the treatment of acute and subacute sinusitis, and in coryza when sinus involvement develops.

Bacitracin-Nasal-C.S.C. is supplied dry in 15 cc. bottles with accompanying dropper. It is reconstituted by the pharmacist just before being dispensed.

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1. Prigal, S. J.: Bacteriologic and Epidemiologic Approach to the Treatment of Respiratory Infections with Aerosols of Specific Antibiotics, Bull. N. Y. Acad. Med. 26:282 (Apr.) 1951.
2. Stovin, J. S.: The Use of Bacitracin in the Treatment of Sinusitis and Related Upper Respiratory Infections, New York Physician 32:14 (July) 1949.
3. Prigal, S. J., and Furman, M. L.: The Use of Bacitracin, a New Antibiotic in Aerosol Form; Preliminary Observations, Ann. Allergy 7:662 (Sept.-Oct.) 1949.

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South Dakota, annual meeting, Cataract Hotel, Sioux Falls, June 3-5.

Texas, annual meeting, Shamrock Hotel, Houston, April 26-28. Program Chairman, H. G. Grainger, Tyler.

Vermont, annual meeting, October 3-4. Program Chairman, Edward T. Newell, Burlington.

Virginia, annual meeting, The Lodge, Williamsburg, May 18, 19. Program Chairman, Felix D. Swope, Alexandria.

Washington: See Northwest Osteopathic Convention.

West Virginia, annual meeting, Shenandoah Hotel, Martinsburg, May 13-15. Program Chairman, Edward D. Hersh, Weirton.

Western States Osteopathic Society of Proctology, annual meeting, Mayo Hotel, Tulsa, Okla., September 27-29. Program Chairman, Layne Perry, Tulsa.

Wisconsin, annual meeting, Hotel Schroeder, Milwaukee, May 10, 11. Program Chairman, John S. Anderson, River Falls.

Wyoming, annual convention, Rawlins, June 2-3.

OFFICIAL AND AFFILIATED ORGANIZATIONS

ARKANSAS

State Society

Speakers at the annual meeting to be held in Little Rock April 30-May 1 are to be Chester C. Chapin, Little Rock, and Angus G. Cathie, Philadelphia, according to an advance announcement. Also on the program are to be the U. S. Government films on Atomic Energy and demonstrations of manipulative technics.

CALIFORNIA

Cancer Commission

A symposium having as its theme "The Diagnosis and Treatment of Cancer of the Gastrointestinal Tract" was to be presented with the cooperation of the State Department of Public Health in Oakland on February 11. Three sessions were to be held, one on "Diagnosis and Treatment of Cancer of the Esophagus," one on "Diagnosis and Treatment of Cancer of the Stomach," and one on "Diagnosis and Treatment of Cancer of the Colon and Rectum." At each session "Surgical Considerations" were to be discussed by Orville F. Grimes, M.D., San Francisco; "Radiological Considerations" by Dan Tucker, M.D.; and "Pathological Considerations" by Robert J. Parsons, M.D., both of Oakland.

Topics of recent and forthcoming meetings held in conjunction with the Osteopathic Surgical Society of Los Angeles were: March 5, "Cancer of the Female Genitalia," and April 2, "Cancer of the Breast," according to an announcement received in advance.

Component Officers Association

At the meeting which was to be held in Fresno February 18, J. Gordon Epperson, Oakland, was to discuss the Association's activities during the year; Glen D. Cayler was to speak on the effect of legislation on practice rights; Betsy B. MacCracken was to speak on the relationship of osteopathic physicians to county health department and volunteer health clinics; and Mr. Thomas C. Schumaker was to give a report on the Association's participation in civilian defense. The last three speakers are from Los Angeles.

Hollywood Osteopathic Luncheon Club

The officers are: President, Clyde F. Gillett; vice president, J. Holt Robison; secretary, Clara L. Treat; and treasurer, Walter V. Goodfellow. All are from Los Angeles.

FLORIDA

Pinellas County

The officers are: President, Luther E. Rockhold, Largo; vice president, Donald G. Perry, St. Petersburg; and secretary-treasurer, Warren B. Mulhollan, Clearwater.

Committee chairmen are: Membership, Dr. Mulhollan; ethics, hospitals, and clinics, Hugh T. Kirkpatrick, Pass-a-Grille Beach; legislation, Basil F. Martin; public health, George S. Rothmeyer; and public relations, Paul J. Dodge, all of St. Petersburg.

IDAHO

Boise Valley

At the meeting in Nampa January 18, D. W. Hughes, Boise, gave a report on professional affairs, which was followed by a round table discussion with Andrew E. Johnson, Nampa, presiding, and F. M. Ge Meiner, Nampa, Lloyd A. Peterson, Mountain Home, and Leland J. Anderson and Betty Lou Crane of Boise participating.

ILLINOIS

Third District

The officers are: President, E. O. Larson, Galesburg; vice president, Loy E. Hewitt, Kewanee; and secretary-treasurer, Virginia M. Welch, Macomb. Wilmer N. Stienbarger, Augusta, is the trustee, and Ellis M. Atkinson, Galesburg, is alternate trustee.

Fifth District

At the meeting in Rantoul on January 18 Royal Lee, D.D.S., president of the Vitamin Products Co., Milwaukee, spoke on "Nutrition."

Eighth District

The officers are: President, O. W. Cramer, East St. Louis; vice president, E. Gale Jones, Granite City; and secretary-treasurer, Laurin E. Wood, Salem. All were re-elected.

Dr. Cramer is the trustee, and John G. Switzer, Vandalia, is alternate trustee.

IOWA

Second District

The officers are: President, Gladys Worth Burke, Council Bluffs; vice president, William S. Edmund, Red Oak; and secretary-treasurer, William T. Ferguson, Pisgah. All were re-elected.

Fourth District

The officers were reported in the January JOURNAL. The trustee is Robert K. Richardson, and the chairman of the convention arrangements committee is R. W. Shultz, both of Mason City.

KANSAS

Wichita

The officers were listed in the November JOURNAL. The trustee is Robert L. Wright, Wichita.

MASSACHUSETTS

State Society

The officers are: President, Samuel B. Jones, Worcester; vice president, John A. Robertson, Arlington; secretary, Robert R. Brown, Belmont; and treasurer, Amalia Sperl, Haverhill. All were re-elected. The executive secretary is Mrs. Gladys M. Stockdale, Newtonville.

The trustees are George E. Cox and Stanley W. Kimball, Boston, R. Willard Hunt, Lexington, Alden Q. Abbott, Waltham, A. Warren Sandberg, Andover, David W. Morrison, Pittsfield, William H. Niedner, Taunton, and Richard O. Gifford, Worcester.

According to an announcement received in advance, the following talks were to be included in the program of the annual meeting, which was to be held January 20 and 21 in Boston: "Fundamental Physiology," Rupert H. Kendall; "Diagnosis of Cancer by Vaginal Smears," Lionel J. Gorman; "Sciatica," Edward B. Sullivan; "Symptomatology in Disorders of the Large Bowel," Alan J. Snider; "Diverticulosis and Diverticulitis," Ronald A. Mertens; "Civilian Defense at the State Level," Robert E. S. Kelley, M. D., all of Boston; "Wryneck," Paul M. Brose, Holyoke; "Treatment of Back Strains due to Industrial Accidents," Francis E. LeBaron, Foxboro; "Shingles," Walter N. Keene, Newtonville; "Strabismus," Roy W. Teed, Brookline; "Fundus Diagnosis with the Ophthalmoscope," Arthur A. Martin, Malden; "Value of X-Ray in Osteopathic Practice and Progress," Gervase C. Flick, Chestnut Hill and Stanley W. Kimball, Boston; and "Tic-Spastic," Perrin T. Wilson, Cambridge, Elsie W. Weeks, Boston, Earl C. Stevenson, Quincy, and William T. Knowles, Eastham. Also on the program were a symposium on Atomic Warfare and Civilian Defense, including "Civilian Defense and the Atomic Bomb," Jeanette A. Lumsden, Boston, "Facts about Atomic Fission and the Acute Radiation Syndrome," Frederick S. Lenz, Cranston, R. I., "Radiation, Biology and Pathology," H. Earle Beasley, Boston, and "Management of Shock, Thermal and Radiation Injuries," G. Stevens McDaniel, Jr., East Greenwich, R.I.; and a pediatric round table conducted by Nelson D. King, Boston, Walter M. Pelser, Wickford, R. I., Ruth Bailey, Scituate, and Winifred Shaffer Miller, Newton.

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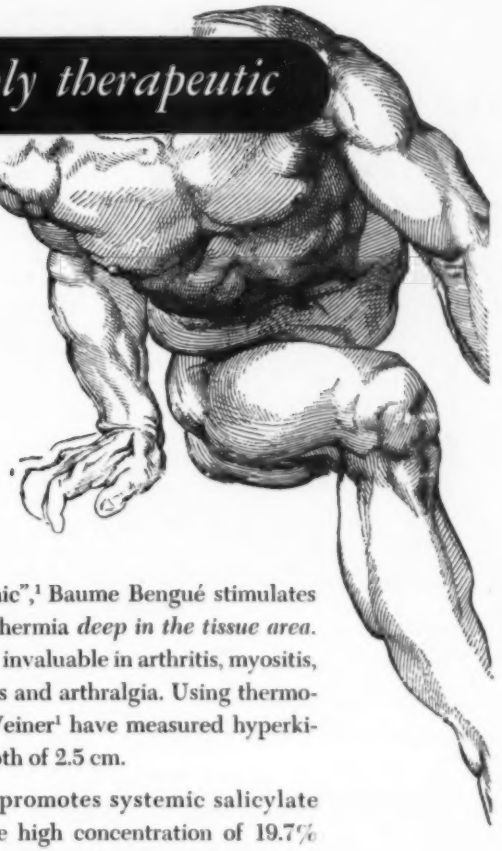

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1. Lange, K., and Weiner, D.: J. Invest. Dermat. 12:263 (May) 1949.

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1 Dr. Walter Alvarez, Tice's Practice of Medicine, Vol. VII, p. 144

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Mystic Valley

The officers are: President, Ross E. Chapin, Arlington; vice president, Kenneth R. Holbrook, North Hollywood; and secretary-treasurer, Stuart K. Partridge, Malden.

R. Willard Hunt, Lexington, is the trustee.

Committee chairmen are: Vocational guidance, Frank O. Berg, Malden; and civil defense, John A. Robertson, Arlington, and W. Hadley Hoyt, North Reading.

MICHIGAN

Past Presidents' Council

The officers are: Chairman, Robert K. Homan, Highland Park; vice chairman, Philip E. Haviland, Detroit; and secretary-treasurer, Hobert C. Moore, Bay City.

Other members of the council are W. Carl Brenholtz, Flint, and Willis H. Yeamans, Mt. Clemens.

War Veterans' Association

The officers are: President, Chester J. Zwissler, Benton Harbor; and secretary-treasurer, Wilson L. Brott, Traverse City.

Capitol

The officers are: President, Hugh B. Beardslee; and secretary-treasurer, H. G. Porter (re-elected), both of Lansing.

R. J. Krainik, F. Hoyt Taylor, and Virgil C. Symmonds, all of Lansing, are the trustees.

Central

The officers are: President, G. W. Stevens, Big Rapids; vice president, L. Linton Budd, Carson City; and secretary-treasurer, Emory R. Remsberg, Alma.

Emmett Binkert, Carson City, and H. William Guinand, Riverdale, are the trustees.

East Central

The officers are: President, Harold C. Bruckner, Clio; vice president, L. R. Clifford, Flint; and secretary-treasurer, E. George Textor, Mount Morris.

The trustees are Neil M. Woodruff and John H. Laird, both of Flint.

Eastern

The officers are: President, William F. Scully, Marine City; vice president, Roy S. Young, Harbor Beach; and secretary-treasurer, Randall G. Bostick, Capac.

Kent County

The officers are: President, Roy G. Bubeck, Jr. (re-elected); vice president, Maurice R. Lee (re-elected); secretary, Henry G. Olen; and treasurer, Joseph G. King (re-elected), all of Grand Rapids.

Arthur T. Taylor and Arthur H. Witthohn, both of Grand Rapids, are the trustees.

Macomb County

The officers are: President, J. Calvin Geddes, Mt. Clemens; vice president, Leonard Latos, Van Dyke; and secretary-treasurer, Warren P. Adams, St. Clair Shores.

The trustees are Raymond G. Markle, Mt. Clemens, and John F. Paul, New Baltimore.

Northeastern

The officers are: President, Alfred D. Hammond (re-elected), Roscommon; vice president, Jack R. Georges; Cheboygan; and secretary-treasurer, Edward G. Papp (re-elected), Prescott.

Northwestern

The officers are: President, Frank S. Thomas (re-elected); vice president, Wilson L. Brott, both of Traverse City; and secretary-treasurer, George K. Green, Elk Rapids.

Saginaw Valley

The officers are: President, Donald E. Chute, Bay City; vice president, Lynn Hooker, Freeland; and secretary-treasurer, M. B. Goldberger (re-elected), Saginaw.

Walter C. Adams, Chesaning, John M. O'Connor, Essexville, and Irving W. Graw and Robert H. McDowell, Saginaw, are the trustees.

Southeastern

The officers are: President, Leland S. McCleery, Ann Arbor; vice president, Toivo F. Tienvieri, Petersburg; and secretary-treasurer, James P. Whitmore (re-elected), Marquette.

Southwestern

The officers are: President, Wilbur H. Stocker, Benton Harbor; vice president, Alton A. Hinks, Three Oaks; and secretary-treasurer, Richard S. Reynolds, Benton Harbor.

Joe F. Reed, Watervliet, and Chester J. Zwissler, Benton Harbor, are the trustees.

Upper Peninsula

The officers are: President, Anne C. Palmatier, Crystal Falls; vice president,

Hollis G. Morrow (re-elected), Sault Ste. Marie; and secretary-treasurer, James P. Whitmore (re-elected), Marquette.

Wayne County

The officers are: President, Donald J. Evans, Detroit; vice president, C. B. Potter, Trenton; and secretary-treasurer, John H. Morrison (re-elected), Detroit.

The trustees are Edmund A. Bowman and H. A. Fisher, Detroit, and William F. Costello, Trenton.

J. N. Secor, Rockwood, is the statistician.

MISSOURI
Central Ozark

The theme of the January 4 meeting in Rolla was "Normal Values in X-Ray Diagnosis." A general discussion of films presented was held, with all attending members participating.

MONTANA
Billings

The officers are: President, T. G. Gunderson, and secretary-treasurer, Hewes O. Harris, both of Billings. Both were re-elected.

NEW JERSEY
Bergen-Passaic County

An American Cancer Society film, "Early Diagnosis of Cancer," was presented at the January 5 meeting, after which a question and answer forum on cancer was conducted by Ruth V. Waddell, Oradell, and Melvin Elting, Teaneck.

NEW YORK
State Society Auxiliary

The officers are: President, Mrs. William B. Strong, Brooklyn; president-elect, Mrs. Hewett W. Strever, Rochester; vice president, Mrs. Eugene J. Casey, Binghamton; recording secretary, Mrs. Harry W. Learner, East Aurora; corresponding secretary, Mrs. Warren Tucker, Long Island; and treasurer, Mrs. Robert R. Ross, Syracuse.

New York City

Mr. George H. Chapman, director of the Clinical Research Laboratory, New York City, was to speak on "Laboratory Research: the Answer to Chronic Disease" at the January 10 meeting in New York City.

At the February 21 meeting, State Society officers were to present their reports to the district members.

NORTH CAROLINA
State Society

Officers and trustees were reported in the August JOURNAL.

Committee chairmen are: Public education on health, Talmage T. Spence, Raleigh; ethics, Ernest W. Bush, Southern Pines; program, Elizabeth E. Smith, Asheville; and vocational guidance, J. Ella Hardin, Durham.

OHIO
First District (Toledo)

A report on the state association was given by Theodore C. Hobbs at the November 15 meeting in Toledo.

Second District (Sandusky)

George F. James, Lakewood, was guest speaker at the December 13 meeting.

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The January meeting was scheduled to be held in Oberlin.

Third District (Cleveland)

A panel discussion, "Osteopathy and Osteopathic Manipulation," was to be presented at the January 8 meeting by Clarence V. Kerr and Robert E. Truhlar, Cleveland, and Gerald M. Stevenson, Kent.

Eighth and Tenth Districts (Akron and Canton)

Robert H. Reddick, M.D., Cleveland, was to address the December joint meeting on "What Is Being Done and What Can Be Done for the Mentally Ill Patients." Members of neighboring district academies were invited to attend.

OREGON
Southern Oregon

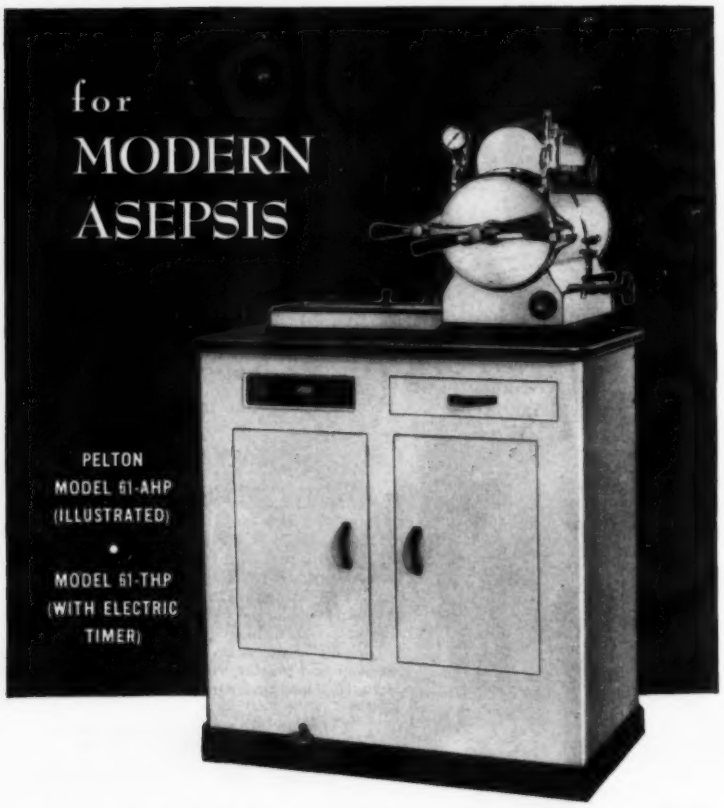
The December meeting was scheduled to be held in Medford.

Willamette Valley

Luceo Mossman, Portland, spoke on manipulative technics and presented a demonstration at the January 13 meeting in Salem.

PENNSYLVANIA
Berks County

The officers are: President, Sylvester L. Freeman, Hamburg; vice president,



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Russell E. Fry; and secretary-treasurer, Frank A. Beidler, both of Reading.

TENNESSEE

State Society

A partial listing of officers appeared in the December JOURNAL. In addition, the vice presidents are Paul G. Smith, Pikeville, Sunora L. Whiteside, Nashville, and H. F. Bower, Union City.

H. Perry Bynum, Memphis, Marion Edmund Coy, Jackson, Richard H. Alexander, Greenback, John C. Emmons, Chapel Hill, and J. M. Moore, Jr., Trenton, are the trustees.

Committee chairmen are: Legislation and public health, L. Dale Chesemore, Paris; veterans' affairs, Dr. Bynum; federal-state coordinator, Helen T. Godat, Nashville; industrial and institutional service, Dr. Alexander; editorial contact, radio, and publicity, Dr. Moore; membership, B. C. DeVilbiss, Trenton; vocational guidance, Mary B. Davis, Memphis; labor contact, R. C. Hart, Chattanooga; censorship and ethics, Dr. Bower and J. F. O'Bryan, Springfield; education, Dr. Coy; public and professional welfare, R. D. Shepherd, Dunlap; hospitals, John N. Gill, Chattanooga, and Lewis D. Elliston, Covington; and Osteopathic Progress Fund, Jeanne B. Mulsand and Louis A. Mulsand, Townsend.

East Tennessee

A discussion on the diagnosis and treatment of anterior poliomyelitis was presented at the November 19 meeting in Knoxville.

TEXAS

North Texas

Guest speaker at the February 18 meeting was to be C. W. Dalrymple of Little Rock, Ark., who was to present the following talks: "Low-Back Problems," "Ruptured Intervertebral Disks," and "Osteopathic Manipulative Procedures."

District Six

James A. Brown, M.D., Houston, spoke on spinal injuries and their treatment at the December 10 meeting in Houston.

WISCONSIN

Fox River Valley

L. D. Thompson, Green Bay, and D. A. Farnum, Sheboygan, were to report on the recent Divisional Society Conference at the February 8 meeting in Neenah.

Madison

A report of the recent Divisional Society Conference was to be presented by Edward M. Keller, Beaver Dam, at the meeting in Madison on February 3.

Milwaukee

The officers were reported in the July JOURNAL. Ray J. Dennis, Milwaukee, is the trustee.

Committee chairmen are: Membership, Harvey R. Bullis; ethics, Donald E. Lindley; hospitals and clinics, Paul Atterberry; radio, V. Von Wald; legislation and convention arrangements, Frederick E. Hecker, all of Milwaukee; convention program, Dr. Dennis; public health, Harold C. Bahling; statistics, Edwin J. Elton, both of Wauwatosa; and vocational guidance, Richard W. Anderson, Cudahy.

Drs. Atterberry and Elton were to report on the recent Divisional Society Conference at the meeting in Milwaukee on February 1.

Northwest

The report on the Divisional Society Conference was to be given by John S. Anderson, River Falls, at the February meeting.

CANADA

Saskatchewan

The officers are: President, Anna E. Northup-Little, Moose-Jaw; and secretary-treasurer, Doris M. Tanner, Regina. Both were re-elected.

There are no committees.

SPECIAL AND SPECIALTY GROUPS

ACADEMY OF APPLIED OSTEOPATHY

Bay Academy

The officers are: President, Clara MacFarlane Miller, Alameda, Calif.; vice president, Edward I. Kushner, Oakland, Calif.; and secretary-treasurer, Lorna Marian Williams, Berkeley, Calif.

George W. Northup, Livingston, N. J., spoke on "The Mosaic of Disease—an Osteopathic Approach" at the January 26 meeting in Oakland.

Inland Empire

The officers are: President, Harry L. Davis, Walla Walla, Wash.; vice president, Charles M. Mitchell, Pasco, Wash.; and program chairman, Paul E. Emmans (re-elected), Spokane, Wash.

Dr. Davis discussed and presented radiographs of a case of low-back disorder; H. L. Chadwick, Spokane, spoke on general medication; and a film on diabetes mellitus was shown at a recent meeting in Spokane.

Puget Sound

The officers are: President, Martin D. Young, Seattle; vice president, Erskine H. Burton; secretary, Mary Alice Hoover, both of Tacoma, Wash., and treasurer, H. L. Tracy, Seattle.

Talks which were scheduled to be presented at the February 17 meeting in Seattle included "Study of the Orbit," Thomas C. Herren, Kelso, Wash., and Dr. Hoover; "Louisa Burns' Research on the Eye," W. A. Newland, Seattle; "Technics for Treatment of Short Leg," Dr. Burton and Francis D. Goddard, Seattle; "Basic Osteopathy as Taught at Oakland," J. Lowell Kinslow; and "Review: Acute Back Sprain in Industry," Mary Eleanor Gillies, both of Seattle. Also on the program was a question period to be conducted by Dr. Young.

AMERICAN COLLEGE OF OSTEOPATHIC SURGEONS

Officers and members of the Board of Governors were reported in the December JOURNAL. Members of the Executive Committee are Lucius B. Faires; J. Gordon Hatfield, both of Los Angeles; Charles L. Ballinger, Toledo, Ohio; H. L. Collins, Chicago; Orel F. Martin, Coral Gables, Fla.; and Frank A. Dilatush, Dayton, Ohio.

Committee chairmen are: Membership, John P. Schwartz, Des Moines, Iowa, and James O. Watson, Columbus, Ohio; ethics, Dr. Collins; rules and regulations, K. Grosvenor Bailey, Los Angeles; resolutions and ceremonial, J. Willoughby Howe, Hollywood, Calif.; graduate and postgraduate education, C. Lloyd Peterson, Denver; editorial, Arthur M. Flack, Jr.; evaluating, for registry of training programs, James M. Eaton, both of Philadelphia; visual education, Lloyd A. Seyfried, Detroit; special reference, Dr. Watson; finance, Dr. Ballinger; assembly location, Dr. Martin; clearing, J. Donald Sheets, Highland Park, Mich.; and contact booth, Frank A. Dealy, Sea Isle City, N. J.

A.C.O.S. representative on the A.O.A. hospital evaluating committee is Dr. Collins; sergeant-at-arms is J. Clark Hovis, Highland Park, Mich.; program chairman is Albert B. Wheeler, Carthage, Mo.; and convention executive is Dr. Martin.

MICHIGAN SOCIETY OF OSTEOPATHIC ANESTHESIOLOGISTS

The officers are: President, Mahlon L. Ponitz (re-elected), Huntington Woods; vice president, Carl E. Schefold, Highland Park; and secretary-treasurer, Frank S. Thomas, Traverse City.

Members of the board of trustees are J. Maurice Howlett and Yolanda M. Anderson, Highland Park; and J. Calvin Geddes, Mt. Clemens.

Romaine I. Gilbert, Malden, Mass., presented a paper on the hepatorenal syndrome at the meeting in Detroit on January 9. The next meeting was scheduled for February 13.

MICHIGAN OSTEOPATHIC RADIOLOGICAL SOCIETY

The officers are: President, John H. Pulker, Flint; vice president, P. M. Wells, Lansing; and secretary-treasurer, Arthur H. Witthohn, Grand Rapids. Member-at-large is Paul S. Bates, Traverse City.

PENNSYLVANIA SOCIETY OF OSTEOPATHIC ANESTHESIOLOGISTS

The officers are: President, Francis J. Smith, Philadelphia; vice president, George C. Wolf, Lancaster, and secretary-treasurer, Loren G. Woodley, Emmaus.

"Use of Volatile Liquids in Anesthesia" was the topic of a program prepared and presented by J. Craig Walsh, Philadelphia, Charles A. Hemmer, Lansdowne, and Leonard R. Becker, Norristown, at the January 21 meeting in Norristown.

OSTEOPATHIC SURGICAL SOCIETY OF LOS ANGELES

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State and National Boards

ALABAMA

Examinations in June. Address D. G. Gill, M.D., secretary, Board of Medical Examiners, 519 Dexter Ave., Montgomery 4.

ALBERTA

Examinations in April at Edmonton. Address G. B. Taylor, acting registrar, Office of the Registrar, University of Alberta, Edmonton, Alberta.

ARIZONA

Basic science examinations March 20 and June 19 at the University of Arizona, Tucson. Applications must be filed by March 6. Address Mr. Francis A. Roy, secretary, Basic Science Board, Science Hall, University of Arizona, Tucson.

COLORADO

Professional examinations in June. Address Miss Beulah H. Hudgens, executive secretary, Board of Medical Examiners, 831 Republic Bldg., Denver 2.

Basic science examinations in March and June in Denver. Address Esther B. Starks, D.O., secretary, Basic Science Board, 1459 Ogden St., Denver 3.

CONNECTICUT

Basic science examinations June 9 at Yale University, New Haven. Applications must be filed 2 weeks prior to examination. Address Miss M. G. Reynolds, executive assistant, State Board of Healing Arts, 110 Whitney Ave., New Haven 10.

DISTRICT OF COLUMBIA

Professional examinations May 14-15 in Washington. Basic science examinations April 23-24 in Washington. Applications and supporting data for both must be filed by April 1. Address Daniel L. Seckinger, M.D., secretary, Health Department, Commission on Licensure, 4130 East Municipal Bldg., Washington, D.C.

FLORIDA

Professional examinations in June. Applications must be filed 2 weeks prior to the examination. Address Richard S. Berry, D.O., secretary, Board of Osteopathic Medical Examiners, 617-18 Times Bldg., St. Petersburg 5.

Basic science examinations in June. Applications must be filed 2 weeks prior to examination. Address M. W. Emmel, D.V.M., secretary, Board of Examiners in the Basic Sciences, University of Florida, Gainesville.

GEORGIA

Officers of the State Board of Osteopathic Examiners are: President, F. W. Daniels, Fitzgerald; vice president, W. C. Holloway, Thomasville; and secretary, R. E. Andrews, Rome. All are serving for terms which will expire July 1951.

HAWAII

Examinations April 11. Address Mabel A. Runyan, D.O., secretary, Board of Osteopathic Examiners, 2333 C. Kalakaua Avenue, Honolulu 30.

IDAHO

Examinations June 14 in Boise. Applications must be filed by May 31. Address Estella S. Mulliner, director, Bureau of Occupational License, Dept. of Law Enforcement, Boise.

ILLINOIS

Examinations April 10-12 in Chicago. Applications must be filed by April 3. Address Mr. Charles F. Kervin, Superintendent of Registration, Illinois Department of Registration and Education, State House, Springfield.

IOWA

Basic science examinations April 10 in Des Moines. Address Ben H. Peterson, Ph.D., Coe College, Cedar Rapids.

KANSAS

Examinations in June in Topeka. Applications must be filed 30 days prior to date of examination. Address Forrest H. Kendall, D.O., secretary, Board of Osteopathic Examination and Registration, 420½ Pennsylvania Ave., Holton.

MAINE

Examinations June 12 in Augusta. Address G. F. Noel, D.O., secretary, Board of Osteopathic Examination and Registration, Monument Sq., Dover-Foxcroft.

True B. Eveleth, Portland, has been appointed to the Board to fill the vacancy created by the death of Harry H. Campbell.

MARYLAND

Examinations in June. Address Walter H. Waugaman, D.O., secretary, Board of Osteopathic Examiners, 33 S. Centre St., Cumberland.

MICHIGAN

Basic science examinations May 11-12. Applications must be filed by May 1. Address Miss Eloise LeBeau, secretary, Board of Examiners in the Basic Sciences, 101 N. Walnut Street, Lansing.

MINNESOTA

Basic science examinations April 3-4 and June 5-6 in Millard Hall, University of Minnesota, Minneapolis. Applications must be filed in advance. Address Raymond Bieter, M.D., secretary, Board of Examiners in the Basic Sciences, 105 Millard Hall, University of Minnesota, Minneapolis 14.

MISSISSIPPI

Examinations in June. Address Felix J. Underwood, M.D., secretary, Board of Health, Jackson 113.

NEBRASKA

Basic science examinations May 1 and 2 at the University of Nebraska College of Medicine in Omaha. Applications must be filed by April 16. Address Mr. Oscar F. Humble, director, Bureau of Examining Boards, Room 1009, State Capitol Bldg., Lincoln 9.

NEW MEXICO

Basic science examinations in June. Address Mrs. Marguerite Cantrell, secretary, Board of Examiners in the Basic Sciences, P. O. Box 1522, Santa Fe.

NEW YORK

Examinations in June. Applications must be filed 15 days prior to the examination. Address Jacob L. Lochner, Jr., M.D., secretary, Board of Medical Examiners, State Dept. of Education, 23 S. Pearl St., Albany 7.

OHIO

Examinations in June in Columbus. Address James O. Watson, D.O., State Medical Board, 114 W. Third Ave., Columbus 1.

ONTARIO

Examinations in June at Toronto. Address Mr. John C. Beer, secretary, Board of Regents; Drugless Practitioners Act, Room 615, 57 Bloor St., W., Toronto 5.

OREGON

Basic science examinations June 2 at the Lincoln High School, Portland. Address Charles D. Byrne, Ph.D., secretary, State Board of Higher Education, Eugene.

PUERTO RICO

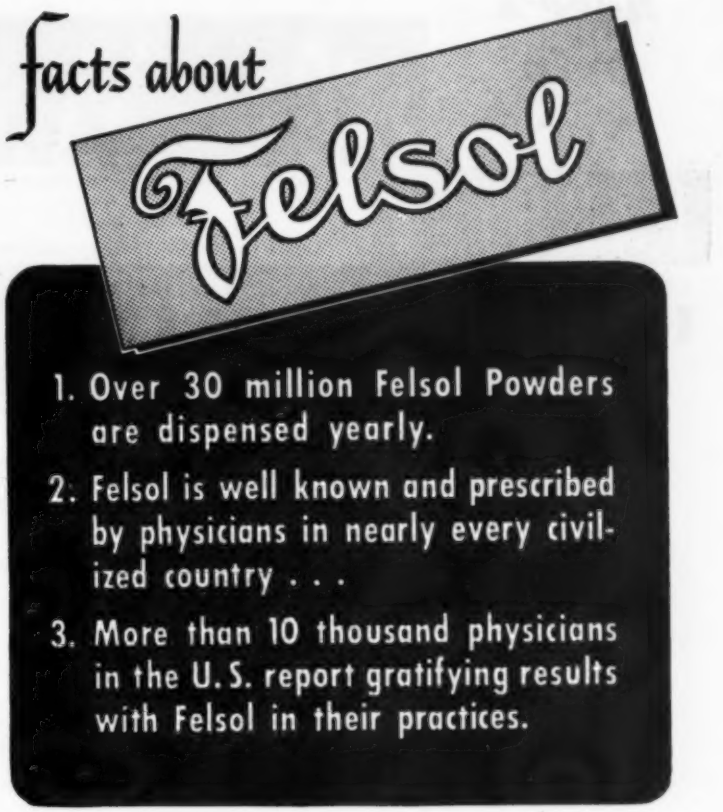
Examinations September 4 in San Juan. Applications must be filed 3 months in advance. Address Mr. Luis Cueto Coll, secretary, Board of Medical Examiners, Box 3717, Santurce.

RHODE ISLAND

Basic science examinations May 9. Address Mr. Thomas B. Casey, Administrator of Professional Regulations, State Office Building, Providence.

SOUTH DAKOTA

Basic science examinations in June. Address Gregg M. Evans, Ph.D., secretary, Basic Science Board, Yankton College, Yankton.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Professional examinations June 14-16 at Austin. Address M. H. Crabb, M.D., secretary, Board of Medical Examiners, Medical Arts Bldg., Ft. Worth 2.

Basic science examinations April 20-21. Applicants are urged to make arrangements immediately. Address Brother Raphael Wilson, secretary, Board of Examiners in the Basic Sciences, 306 Nalle Bldg., Austin.

VERMONT

Examinations in June. Address Charles D. Beale, D.O., secretary, Board of Osteopathic Examination and Registration, Mead Bldg., Rutland.

WISCONSIN

Basic science examinations April 7 at the Loraine Hotel, Madison. Applications must be filed by March 31. Address Mr. William H. Barber, secretary, Board of Examiners in the Basic Sciences, Watson and Scott Streets, Ripon.

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Examinations June 4-5 in Cheyenne. Address Franklin D. Yoder, M.D., secretary, Board of Medical Examiners, State Capitol, Cheyenne.

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April 15—Montana, $2.00 for residents; $1.00 for non-residents. Address Asa Willard, D.O., secretary, Board of Osteopathic Examiners, Wilma Bldg., Missoula.

May 1—Iowa, $1.00. Address Mr. Dwight S. James, assistant secretary, Board of Osteopathic Examiners, 200 Walnut Bldg., Des Moines 9.

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TOWARD BETTER TRAINING AND SERVICES IN MEDICAL NUTRITION*

By Charles Glen King†

The science of nutrition has advanced with remarkable rapidity during the last two decades, and the public is intensely aware of the fact that food is an important factor in public health as well as a major item in family budgets.

Agricultural life is increasingly guided by the science of foods and the interrelationship of foods, soil, and health.

Every alert farmer can see the striking effect of mineral elements and organic mulches upon the productivity of his soil. The farmer's family can see with equal clarity the effects of vitamin D, mineral elements, such as iodine, and choice animal proteins, such as milk and meat scrap, upon the growth of farm animals.

No less striking has been the growth of applied nutrition science in the food manufacturing industry and within the chemical industry.

The gains in public health and in an improved national economy that have resulted from these advances can scarcely be challenged. They are too well known.

Neither can the medical profession escape responsibility for leadership in bringing the results of basic research in nutrition to the service of general practice in medicine and in protective measures to conserve public health.

As schools of medicine and public health have increased their teaching and research in biochemistry, physiology, pediatrics, obstetrics, dietetics, nursing, and general measures to protect public health, there has been a natural and substantial need for developing in each institution a division or department in which primary emphasis is placed upon

*Reprinted from *Public Health Reports*, December 22, 1950.

†Scientific Director of the Nutrition Foundation, and Professor of Chemistry, Columbia University.

medical nutrition. Further developments of this nature are of urgent importance and should represent opportunities of outstanding attractiveness for young medical scientists. It is axiomatic that such academic posts should be characterized by emphasis upon both basic and clinical research, as well as upon teaching and active participation in professional societies.

Similarly, in schools of agriculture and in the graduate divisions of chemistry and the biological sciences in nearly all of the leading universities, there has been a steady growth in the research and teaching activities pertaining to human and animal nutrition—both from a basic science point of view and in terms of specific training for careers in agriculture, in the food industry, in many related government agencies, and in the manufacture of biological products, such as yeast and antibiotics. Nearly all of the larger food manufacturers now maintain extensive research and development laboratories in which nutrition scientists find attractive opportunities. And in the chemical industry, the manufacture of antibiotics headed the list of pharmaceutical products in 1949, followed by vitamin manufacture as a close second. Recognition of this vigorous trend is shown by the introduction this year of newly organized professional training programs in biochemical engineering at the Massachusetts Institute of Technology and at Columbia University.

In 1950, it is already evident that the manufacturers of antibiotics and vitamins have found common ground in the feeding of vitamin supplements and antibiotic concentrates to poultry and livestock. Apparent practical gains in growth and health have resulted in feeding the products to turkeys, chickens, and pigs. It is too early to evaluate the practical significance of such developments, but it is very likely that they will expand fairly rapidly, first in animal feeding, then by diligent efforts to introduce the supplements into the human food supply.

The public generally is intensely interested in the rapid advances demonstrating complex and far-reaching relationships of food practices to health. This response on the part of the public, leaders of industry, government officials, and administrative officers in the universities creates a demand for well-informed medical advice and leadership beyond the range of information generally available from medical specialists in other fields. There is good reason to believe that this trend will continue into the future with increased rather than lessened emphasis.

Throughout the different sections of the United States there is unmistakable evidence that leaders in agriculture, education, industry, and public health see the need for special training of young medical personnel to meet the opportunities and responsibilities that are already at hand. Hence, it is a matter of first-rate importance that in each section of the country there should be well-organized, vigorous programs of training and research in schools of medicine and public health. Such programs are needed not only to provide the training that is desired by medical personnel but also to provide recognized centers as focal points where reliable counsel and advice is available to all of the groups who have a major stake in the production, distribution, and use of foods, in maintaining adequate education of the public, and in the broader aspects of civic administration for the protection of public health.

Until there is adequate leadership on the part of the medical profession, there will be wasteful practices and needless sacrifices of public health, in part, as a result of the public turning to incompetent sources of guidance and, in part, through failure to develop appreciation of the importance of food practices in protecting health and in building a sound over-all economy.

The Department of Agriculture has developed relatively strong and comprehensive programs of research and education, channeled primarily through the State agricultural colleges, experiment stations, and extension services. State and municipal departments of health have also made important contributions to public education, particularly in city areas where the Department of Agriculture has given less emphasis to its program. But these agencies and many industrial and private organizations would gain from having available within

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each area physicians who are recognized for their leadership and special interest in the field of nutrition. These individuals could exert a strong and stabilizing influence in educational measures by participation in the programs and conferences of many organized groups in their respective areas. Another fruitful channel of public service lies in the opportunity to keep the medical profession itself well informed and interested in food practices that are of primary importance.

The recent appointment of consultants in medical nutrition to the Office of the Surgeon General of the Public Health Service represents an outstanding accomplishment toward developing the kind of leadership that is needed.

HOW MUCH SAFER CAN MATERNITY AND INFANCY BE?*

The concerted efforts to reduce the hazards incidental to maternity and infancy have been richly rewarded. As recently as 1938 the maternal mortality rate in the United States was 4.4 per 1,000 live births; by 1948, the latest year for which complete data are available, the rate was only 1.2. At the same time the infant mortality rate dropped from 51 to 32 per 1,000 live births. Estimates for 1950 indicate that maternal mortality is down to the remarkably low rate of less than 1 per 1,000 live births and that infant mortality has dropped to 29 per 1,000. The fact that the declines occurred during a period of rising birth rates added considerably to the number of mothers and babies saved.

Every area of the country shared in the gains made against maternal and infant mortality. The relative decline in maternal mortality among white women was quite uniform throughout the country. The smallest decrease in the decade was in the East South Central region, but even here it amounted to 69 percent, compared with 75 percent for the country as a whole. Nonwhite women also experienced a large decline in maternal mortality, but in no area did it measure up to that for the white. In 1948 the maternal mortality rate was 3.0 per 1,000 live births for nonwhite women and 0.9 for white women—a ratio of more than 3 to 1.

Infant mortality likewise showed a substantial decline throughout the country. In the decade under review the rate among white babies dropped 40 percent or more in 20 States; in only two States was the reduction less than 30 percent. Improvement among the colored was somewhat more rapid than for the white in the country as a whole, the decrease amounting to 42 percent between 1936-1938 and 1946-1948; the corresponding figure for white infants was 39 percent. Nevertheless, mortality in infancy among the colored is still higher by well over 50 percent, and the opportunity for further reductions is still very substantial.

The marked improvement in maternal and infant mortality can be traced to a variety of factors. Not only have standards of obstetrical practice been raised, but the number of specialists has increased as well. At the same time, hospitalization of births has become much more frequent as facilities for maternity cases have been expanded and as insurance plans have enabled an increasing number of people to use hospital services. The use of chemotherapy and the antibiotics has been so effective in controlling puerperal infections that they are no longer the leading cause of maternal deaths. Furthermore, the toll of life exacted from mothers and infants has been reduced materially by State laws requiring premarital and prenatal examinations for syphilis and by improved methods of treating the disease. Better nutrition has also played a considerable role, especially in reducing the death rate among babies.

The question now is how much further can we expect maternal and infant mortality to decline in the near future? Although the maternal mortality rate is now down to a little under 1 per 1,000 live births, it can be reduced still further, possibly as much as one half within the next 5 years. This may seem unduly optimistic, but it has a good basis in fact. In 1948 Oregon had a maternal mortality rate of only 0.4 per 1,000 live births; in Washington, Utah, and Connecticut the rates were only slightly

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Co., December, 1950.

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*Slater, F. C.: Am. J. Obst. & Gynec. 59:1089 (May) 1950.

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higher. It now remains for the other States to do as well; the goal is already within the reach of many. The nonwhites especially have a great opportunity to reduce their maternal mortality.

The potentialities for life conservation are far greater among infants than among mothers; while puerperal causes now take the lives of fewer than 4,000 women a year, close to 110,000 babies die annually in our country before they reach their first birthday. This toll can be cut appreciably through the wider application of the measures that have already proved so successful. The steps taken to provide special care for premature babies should save many lives, inasmuch as such infants contribute about one third of the total mortality under 1 year of age. Furthermore, research is constantly adding to the storehouse of knowledge on the prevention and treatment of diseases among young children. Altogether, it is not utopian to expect that the infant mortality rate in the United States will be reduced much further before too long.

ACCIDENTS TOOK 89,000 LIVES IN 1950*

Preliminary figures indicate that accidents claimed approximately 89,000 lives in the United States in 1950, or about the same number as in 1949. The individual classes of accidents, however, show contrasting trends. Motor vehicle accident fatalities increased sharply in 1950 and fatal occupational injuries were up slightly. On the other hand, home accidents and public accidents (except motor vehicle) took fewer lives than in the year before.

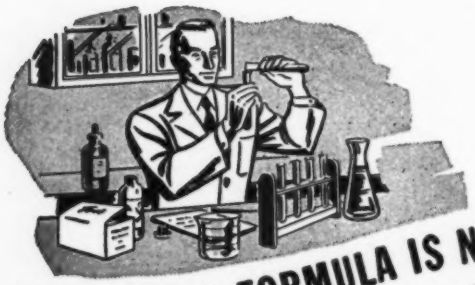
About 35,000 people were killed in motor vehicle mishaps in 1950; this alone accounts for 40 percent of the total mortality from accidents in our country. Injuries in and about the home caused approximately 27,000 deaths—almost one third of the total. There were about 15,500 deaths from occupational accidents, including occupational motor vehicle fatalities; deaths in public accidents (except motor vehicle) are estimated at around 13,000.

The marked increase in motor vehicle fatalities—from 31,500 in 1949 to 35,000 in 1950—is a disturbing development. This rise brought the death toll to the highest point since the peak year 1941, when nearly 40,000 persons were killed in such mishaps. There is little consolation in the explanation that the rise in 1950 was accompanied by an increase in motor vehicle mileage to a record high. The facts point to a need for intensification of the safety campaign to promote better driving habits and to improve traffic control.

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Co., December, 1950. The figures used in this article are based on the Sixth Revision of the International List of Causes of Death.

Catastrophes—accidents in which five or more persons are killed—were just about as frequent in 1949 as in 1950, but they took a substantially larger number of lives in the year just passed. Records compiled from a variety of sources by the Statistical Bureau of the Metropolitan Life Insurance Company indicate that nearly 1,500 persons were killed in catastrophes up to the closing week of 1950. Although the loss of life was about 250 greater than in the year before, it was not far from the average for the long period covered by the Metropolitan's studies of catastrophes. With respect to accidents taking 25 or more lives, however, 1950 had a bad record. For the first time since 1947 a single disaster brought accidental death to as many as 100 persons. A toll of this magnitude was exacted by the wind and snow storm which hit the Northeastern United States on the weekend of November 25th. The railroad wreck on Thanksgiving Eve in Kew Gardens, N. Y., killed 78 persons. The transport plane accident over Lake Michigan was third on the list with 58 deaths—a new high for any one mishap in civil aviation in the United States.

Altogether there were 11 disasters in 1950 which took 25 or more lives. The aggregate of lives lost in such accidents was in excess of 500, or ap-



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proximately one third of the total for all catastrophes. There were six disasters of this magnitude in 1949 and in 1948, accounting for 278 and 228 lives, respectively.

The number of deaths resulting from railroad and water transportation catastrophes was considerably higher in 1950 than in 1949. Military aviation also showed a substantial rise, reflecting the stepped-up pace of activities in our armed forces. On the other hand, the death toll in civilian aviation and motor vehicle catastrophes was down somewhat. Conflagrations, burns, and explosions as a group showed little change. It is noteworthy that although the number of natural disasters—such as tornadoes and floods—were fewer in 1950 than in the year before, they claimed about the same number of victims in both years.

In 1950, conflagrations, burns, and explosions together accounted for well over one quarter of all the catastrophes and for about one fifth of the deaths involved in such accidents. Motor vehicle accidents also contributed more than one quarter of the catastrophes but were responsible for only about one sixth of the fatalities. Although natural disasters accounted for only about one fourteenth of the catastrophic accidents, they caused about one sixth of the deaths.

LONGEVITY OF INDUSTRIAL WORKERS*

In the past four decades the health of workers in our country has received increasing attention from physicians, engineers, chemists and other technicians. Industrial medicine has become a well organized specialty, and the safety movement has spread widely. More and more, manufacturing plants have been designed to provide better light and ventilation and better working conditions generally. Hours of labor have been shortened, and the economic status of the worker has been greatly improved. All these gains, together with the advances in medical science and sanitation, have materially increased the longevity of American wage-earners.

A good index of the gains in the longevity of workers is the experience among white males insured in the Industrial Department of the Metropolitan Life Insurance Company, who constitute a large cross-section of urban wage-earners. The average industrial worker at age 20 can now look forward to 48.4 additional years of life; under the mortality conditions prevailing in 1911-1912 he might have expected to live only 36.9 additional years. Thus, within less than four decades, 11½ years have been added to the expectation of life of the average worker starting out on his career. Notable gains, in fact, have been made at every working age. At age 30 the increase amounted to 9.7 years between 1911-1912 and 1949, and at age 40 to 7.0 years; even at age 60 there was a gain of 3.4 years.

The increase in the longevity of industrial workers reflects very marked declines in mortality from a number of causes. The tuberculosis death rate at the main working ages, 20 to 64 years, dropped more than 90 percent—from 433.5 per 100,000 to 42.3 between 1911-1912 and 1948-1949. Pneumonia and influenza have recorded almost as spectacular a decline. The death rates from the cardiovascular-renal diseases and from diabetes dropped one third among white males at the working ages. Other diseases, such as typhoid fever and lead poisoning, which used to take a considerable toll of life among industrial workers, have been virtually eliminated as causes of death. Mortality from accidents has also shown a marked improvement—namely, 56 percent. Cancer alone of the major causes of death shows an increase. However, it is likely that a large part of this rise is spurious and may be attributed to the increasing number of cases recognized and reported on the death certificate. For all causes of death combined, the rate for white males at 20 to 64 years declined 61 percent within less than four decades.

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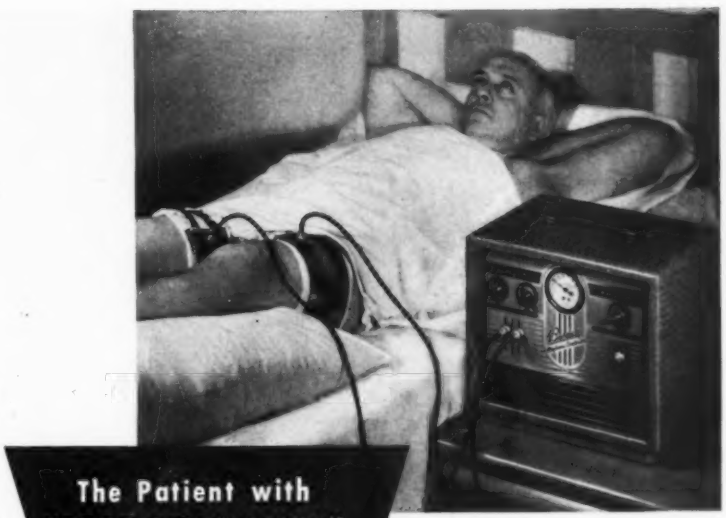
*This article reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Co., November, 1950, is based on a paper by Louis I. Dublin, Ph.D., Second Vice-President and Statistician and Robert J. Vane, Metropolitan Life Insurance Company, presented at the 78th Annual Meeting of the American Public Health Association, St. Louis, Mo., October 31, 1950.

As a result of his rapid gains in longevity, the industrial worker is no longer at great disadvantage in remaining lifetime as compared with other workers. In 1948 the expectation of life at age 20 was only 1 year less among white male Industrial policyholders than among white men in the general population of the United States. This is in contrast to a difference of nearly 6 years in 1911-1912. The gap has also been narrowing at the other working ages.

There is still much that can be done to reduce further the mortality of industrial workers. This task would be facilitated if there were available detailed mortality data for people engaged in the various occupations. A complete study of occupational mortality would answer many questions for which there is now no answer. What has been the over-all effect on mortality from tuberculosis and other causes of the measures instituted to control the hazard of silica dust among granite cutters, tunnel and subway workers, sandblasters, and other workers exposed to this hazard? What are the effects, if any, on the mortality from specific causes among workers exposed to inorganic dusts not containing free silica or asbestos? Has mortality from pneumonia among iron and steel mill and foundry workers been markedly reduced by the use of new drugs? What, if any, are the effects on mortality of exposure to radiations among workers in the field of nuclear fission? Are there other classes of workers exposed to unsuspected dangers to life, such as the chromate workers, who quite recently were discovered to have a very high mortality rate from cancer of the lungs?

There is urgent need to secure comprehensive occupational mortality statistics in connection with the 1950 Census. Individual States can help by cooperating with the National Office of Vital Statistics and by making detailed analyses of their own material, giving special attention to conditions in the industries peculiar to their part of the country. Such studies would yield important information on the effects of various occupations and would undoubtedly lead to further improvement in the health and longevity of American workers.



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Brower, Ralph P., KC '50; Lamb Memorial Hospital, 1560 Humboldt St., Denver 6, Colo.

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Carmichael, Clarence E., from 201 S. Rosemead Blvd., to 5625 N. Rosemead Blvd., Temple City, Calif.

Chesnut, Hervy H., from Los Angeles, Calif. to Coalinga Mineral Springs, Box 307, Coalinga, Calif.

Clark, George F., from 408½ W. 75th St., to 7329 Broadway, Kansas City 6, Mo.

Cohen, Bernard J., from Elkins Park, Pa., to 1116 Orleans Road, Cheltenham, Pa.

Cooper, Benjamin B., from Detroit Mich., to 1506 E. Culver St., Phoenix, Ariz.

Cornell, Philip H., from Detroit, Mich., to Homestead Osteopathic Clinic, 2489 Fort St., Wyandotte, Mich.

Covolus, John J., from Lancaster Osteopathic Hospital, to 31 W. James St., Lancaster, Pa.

Crabb, Samuel L., from 1940 El Cajon Blvd., to 412 Washington St. San Diego 3, Calif.

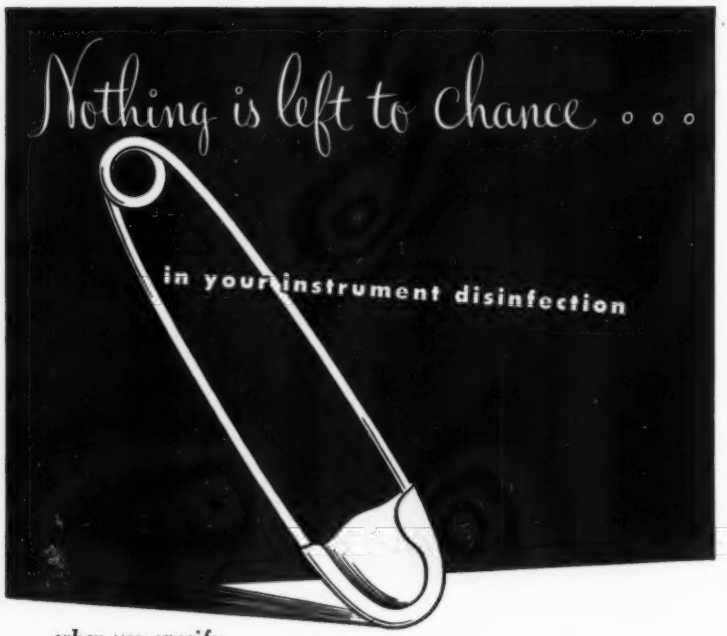
Craun, Howard T., from Sapulpa, Okla., to 3915 E. 32nd St., Tulsa, Okla.

Crawford, F. Marion, from Renwick, Iowa, to Ankeny, Iowa

Danks, W. D., Jr., from 906 18th St., to 1705 21st St., Lubbock, Texas

Dannin, Arthur E., from Toledo Ohio, to 4244 Livernois Ave., Detroit 10, Mich.

Deutsch, Sheldon F., from Miami Beach, Fla., to South Broward Hospital & Clinic Inc., S. Federal Highway, Dania, Fla.



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Doty, Martha Gene, from Stillwater Okla., to 331 N. Second St., Emmaus, Pa. (Change in name from Martha Gene Davis)

Dierdorff, Verne H., from 12820 Ward Ave., to West Park Clinic, 1815 Ford Ave., Wyandotte, Mich.

Drake, S. Jack, from Burlington, Kans., to Brannon Bldg., El Dorado Springs, Mo.

Drost, E. Bernard, from Building & Loan Bldg., to 215 N. Pine St. North Platte, Nebr.

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Edwards, James D., KC '50; Detroit Osteopathic Hospital, 12523 Third Ave., Detroit 3, Mich.

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Feltoon, Ervin, from Westmont, N. J., to Evans Bldg., Maple Shade, N. J.

Foley, Walter K., from 12213 N. W. Seventh St., to 12233 N. W. Seventh Ave., Miami 38, Fla.

Gaddy, Henry F., from 619 McBirney Bldg., to 1501 S. Main St., Tulsa 5, Okla.

Gasperich, Frank J., from Tulsa, Okla. to Box 644, Sand Springs, Okla.

Hammack, Boyd E., from San Gabriel, Calif., to 9606 Lower Azusa Road, Rosemead, Calif.

Harmon, Jacob L., from 416 Maple Blvd., to 6203 Olive St., Kansas City 4, Mo.

Harnish, E. Thomas, from Detroit, Mich. to 16½ E. Broad St., Newton Falls, Ohio

Henry, Clyde C., from 2221 Downing St., to Rocky Mountain Osteopathic Hospital, 4701 E. Ninth Ave., Denver 7, Colo.

Henry, Eugene H. from 123 W. Ridgewood Ave., to 247 Franklin Ave., Ridgewood, N. J.

Henry, H. Gordon, from Saginaw, Mich. to Clare General Hospital, Clare, Mich.

Hodshire, Robert L., KC '50; 2420 Prairie Ave., Fort Worth 6, Texas

Hoefner, Victor C., Jr., from Denver, Colo., to 224 Sixth St., Box 307, Windsor, Colo.

Holmes, Fred M., from 946 E. Main St. to 11 N. El Molino St., Alhambra, Calif.

Hoose, John M., from Detroit, Mich., to Box 252, Iron River, Mich.

Horan, John R., from Raymondville, Texas, to 3930 Old Spanish Trail, Houston 21, Texas

Horowitz, Arnold, CCO '49; 2187 Cruger Ave., New York 60 N. Y.

Howe, Clare G., from 8000 Normile Ave., to 6058 W. Fort St., Detroit 9, Mich.

Jasper, William R., from 3034 Harrison St., to 309 Wirthman Bldg., Kansas City 3, Mo.

Kagan, Harvey D., from Beverly Hills, Calif., to 1704 Sunset Blvd., Los Angeles 5, Calif.

Kamen, Robert E., from 170 Lincoln Road, to 145 Lincoln Road Brooklyn 25, N. Y.

Kane, Elliot C., from Gardena, Calif., to 1644 N. Winona Blvd., Los Angeles 27, Calif.

Kelley, Harlan L., from Winfield, Mo., to Troy Bldg., Troy, Mo.

Klein, Erle Lyle, from Eugene, Ore., to Wakeman, Ohio

LaHue Herbert C., from 7641 Belleview Ave., to 1104 W. 76th Terrace, Kansas City 5, Mo.

Levyn, Murry E., from Grand Rapids, Mich., to 1535 Foulkrod St., Frankford, Philadelphia 24, Pa.

Lilly, Jack R., from 1023 Equitable Bldg., to 4405 W. University St., Des Moines 11, Iowa

Little, James R. D., from Halsey, Ore., to First Natl. Bank Bldg., Harrisburg Ore.

Marcom, Gordon A., from Lubbock, Texas, to Box 277, Ladonia, Texas

McAllister, Frederic J., from 720-22 Sixth Ave., to 1103 Fleming Bldg., Des Moines 9, Iowa

McGowan, Thomas B., from 1028 Market St., to 723 S. 52nd St., Philadelphia 43, Pa.

Meyer, Sherman W., from Phoenix Ariz., to 319 Main St., Safford, Ariz.

Millay, E. O., from Anderson, Mo., to Route 2, Noel, Mo.

Morgan, H. Don, KC '50; Box O, Tipton, Okla.

Myers, Albert C., from York, Pa., to 408 Main St., Clarion Pa.

Niesiobedzki, Julius S., from New Britain, Conn., to West Side Osteopathic Hospital, 1253 W. Market St., York, Pa.

Noll, Charles A., from Route 7, Box 313, to 626 N. Duke St., Lancaster, Pa.

Ostermayer, A. Earl, from 154 N. Keswick Ave., to Keswick & Oakdale Aves., Glenside, Pa.

Patterson William Rhodes, from Santa Ana, Calif., to Art Centre Hospital, 5435 Woodward Ave., Detroit 2, Mich.

Pizey, Bryce A., from Long Beach, Calif., to 658 W. Seventh St., San Pedro, Calif.

Posson, Charles R., from Orange, Calif., to 4128 Los Cerritos Diagonal, Long Beach 8, Calif.

Pruitt, Blaine B., from 621 E. "D" St., to 139 N. E. "D" St., Grants Pass Ore.

Richardson, Rufus A., from Big Bear Lake, Calif., to 643 E. Alisal St., Salinas, Calif.

Rieth, Robert L., from Grosse Isle, Mich., to Homestead Osteopathic Clinic, 2489 Fort St., Wyandotte, Mich.

Rogers, Joseph T., from 12820 Ward Ave., to West Park Clinic, 1815 Ford Ave., Wyandotte Mich.

Rogers, Sheila McGown, from 12820 Ward Ave., to West Park Clinic, 1815 Ford Ave., Wyandotte, Mich.

Routzahn, B. M., from 25 Autrey Arcade, to 831 N. Mills, Orlando, Fla.

Sanders, H. W., from 2511½ Avenue S., to 1824 26th St., Snyder, Texas

Seelye, Robert L., from Box 231, to Box 146 Central Lake, Mich.

Shaw, Martha Jeane, from Mount Clemens, Mich., to 606 Swede St., Norristown, Pa.

Shoraga, Louis H., from 911 State St., to Gleason Hospital, 523 Main St., Larned, Kans.

Smith, Charles K., from 360 W. Church St., to 370 W. Church St., Elmira, N. Y.

Smith, Crews Z., from Kansas City, Mo., to Box 415, Shidler, Okla.

Snell, Malcolm E., from 6604 Snider Plaza, to Dallas General Hospital, 5003 Ross Ave., Dallas 6, Texas

Stingley, Luther A., from Mecosta, Mich., to R. R. #3, Wilmington, Ohio

Stohlberg, G. A., from New Prague, Minn., to 2933 Hennepin Ave., S., Minneapolis 8, Minn.

Sultan, Henry H., from 1029 S. Fairfax Ave., to 6309 Wilshire Blvd. Los Angeles 48, Calif.

Sutherland, William G., from Carmel, Calif., to 53 Asilomar Blvd., Pacific Grove, Calif.

Taylor, G. W., from Kansas City, Mo., to 5908 Buena Vista, Mission, Kans.

Taylor Loran L., from 210 E. Fourth St., to 431 S. College Ave., Bloomington, Ind.

Thomas, Frank S., from Traverse City, Mich., to 1708 Jackson Ave., Flint 5, Mich.

Thomson, William A., from 313A Broadway, to 108 S. Sprigg St., Cape Girardeau, Mo.

Tomei, Joseph H., from Clayton, Mo., to Shelbina, Mo.

Vail, Benjamin U. from Persia, Iowa, to 113 N. Main St., St. Albans, Vt.

von Lohr, Morgan W., from Mesick, Mich., to 1398 N. W. 79th St., Miami 38, Fla.

Vortriede, Charles H., from Portland, Maine, to Detroit Osteopathic Hospital, 12523 Third Ave., Detroit 3, Mich.

Welch, Albert D. from Rocksprings, Texas, to 2033 17th St., Corpus Christi, Texas

White, W. Harlan, from Timber Lake, S. Dak., to Hotel Drake, Carthage, Mo.

Wilkins, Robert E., from South Charleston, W. Va., to 1814 Miami St., South Bend 14, Ind.

Wilkinson, John E., from Clearwater Fla., to Box 542, Zephyrhills, Fla.

Wisniewski, R. M., from 156 E. Seminary St., to 180 W. Seminary St., Richland Center, Wis.

Wright, Lulu Herbert, from Kansas City, Mo., to 137 S. Institute St., Richmond, Mo.

Young, Millard B., from 9412 E. 43rd St., to 3631 Wyandotte St., Kansas City 2 Mo.

Yukl, Francis J., from 16 Love Lane, to 3 Government St., Kittery, Maine

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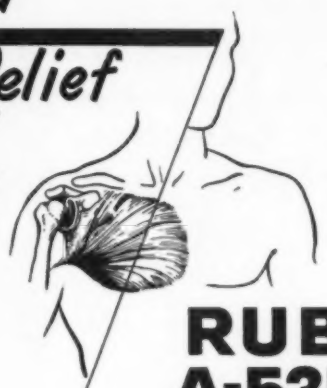

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In the medical section, among the articles of interest are "Surgical Treatment of the Painful, Stiff Hip—(The resection-angulation operation)" by Henry Milch, M.D., "Electroencephalography and the Epilepsies" by Samuel J. Lipnitzky, M.D., and an article by Dr. M. Temkin on the various infectious diseases which prevailed in Palestine.

For further information, communicate with the editorial office of The Hebrew Medical Journal, 983 Park Avenue, New York 28, N. Y.

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Books Received

METHODS IN MEDICINE. The Manual of the Medical Service of George Dock, M.D., Sc.D., Formerly Professor of Medicine, Washington University School of Medicine; Formerly Physician-in-Chief, Robert A. Barnes Hospital, St. Louis. By George R. Herrmann, M.D., Ph.D., Professor of Medicine, University of Texas Medical Branch at Galveston; Director of the Cardiovascular Service and Heart Station, University of Texas Hospital; Consultant in Medicine to the Surgeon General, U.S. Army; Consultant in Vascular Diseases to the Marine Hospital, U.S.P.H.S. Ed. 2, completely revised. Cloth. Pp. 488. Price $7.50. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1950.

THE EXTERNAL SECRETION OF THE PANCREAS. By J. Earl Thomas, M.D., Professor of Physiology, Jefferson Medical College of Philadelphia, Philadelphia, Pennsylvania. Cloth. Pp. 149, with illustrations. Price $3.50. Charles C Thomas, Publisher, 301-327 East Lawrence Ave., Springfield, Ill., 1950.

PHYSICAL EXAMINATION IN HEALTH AND DISEASE. By Rudolph H. Kampmeier, A.B., M.D., Associate Professor of Medicine, Vanderbilt University School of Medicine; Visiting Physician to Vanderbilt University Hospital; Chief of the Medical Outpatient Service, Vanderbilt University Hospital, Nashville, Tennessee. Cloth. Pp. 814, with illustrations. Price $8.00. F. A. Davis Company, 1914 Cherry St., Philadelphia 3, 1950.

DISEASES OF THE TROPICS. By George Cheever Shattuck, M.D., Professor of Tropical Medicine, Harvard Medical School and Harvard School of Public Health, Emeritus; Consultant for Tropical Diseases, Boston City Hospital, and Massachusetts General Hospital. Cloth. Pp. 783, with illustrations. Price $10.00. Appleton-Century-Crofts, Inc., 35 West 32nd St., New York 1, 1951.

NEUROLOGY AND PSYCHIATRY IN GENERAL PRACTICE. Edited by Henry R. Viets, M.D. Cloth. Pp. 150. Price $3.50. Grune & Stratton, Inc., 381 Fourth Ave., New York 16, 1950.

VISUAL ANATOMY: HEAD AND NECK. By Sydney M. Friedman, M.D., Ph.D., Professor of Anatomy, University of British Columbia, Vancouver, Canada; Formerly, Associate Professor of Anatomy, McGill University, Montreal, Canada. Cloth. Pp. 217, with illustrations. Price $6.50. Charles C Thomas, Publisher, 301-327 East Lawrence Ave., Springfield, Ill., 1950.

COLOR ATLAS OF PATHOLOGY. Cloth. Pp. 546, with illustrations. Price $20.00. J. B. Lippincott Company, East Washington Square, Philadelphia, 1950.

PHYSIOLOGY OF THE EYE. By Francis Heed Adler, M.A., M.D., F.A.C.S., William F. Norris and George E. de Schweinitz Professor of Ophthalmology, School of Medicine, University of Pennsylvania, and Consulting Surgeon, Wills Hospital, Philadelphia. Cloth. Pp. 800, with illustrations. Price $12.00. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1950.

ADLER'S PLACE IN PSYCHOLOGY. By Lewis Way. Cloth. Pp. 334. Price $4.50. The Macmillan Company, 60 Fifth Ave., New York 11, 1951.

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THE PREPARATION OF PHOTOGRAPHIC PRINTS FOR MEDICAL PUBLICATION. By Stanley J. McComb, F.B.P., Section on Photography, Mayo Clinic, Rochester, Minnesota. Paper. Pp. 70, with illustrations. Price $2.00. Charles C Thomas, Publisher, 301-327 East Lawrence Ave., Springfield, Ill., 1950.

ILLUSTRATIONS OF BANDAGING AND FIRST-AID. Compiled by Lois Oakes, S.R.N., D.N. (Leeds and London), Formerly Nursing Editor, Nursing Illustrated, Late Sister-Tutor, Walton Hospital, Liverpool, Nursing Technical Officer to Ministry of Labour, Eastern Region Examiner to the General Nursing Council. Ed. 4. Cloth. Pp. 308, with illustrations. Price $2.00. The Williams & Wilkins Company, Mt. Royal and Guilford Aves., Baltimore, 1950.

FUNCTIONAL ANATOMY OF THE LIMBS AND BACK. By W. Henry Hollinshead, A.B., M.S., Ph.D., Head of the Section on Anatomy, Mayo Clinic, Rochester; Professor of Anatomy, Mayo Foundation, University of Minnesota. Cloth. Pp. 341, with illustrations. Price $6.00. W. B. Saunders Company, West Washington Square, Philadelphia 5, 1951.

REST AND PAIN. By John Hilton, F.R.S., F.R.C.S. Edited by E. W. Walls, M.D., Ch.B., B.Sc., Professor of Anatomy in the University of London at Middlesex Hospital Medical School and Elliot E. Phillip, M.A., M.B., B.Chir., M.R.C.S., M.R.C.O.G., Honorary Demonstrator in Anatomy at Middlesex Hospital Medical School. Cloth. Pp. 503, with illustrations. Price $10.00. J. B. Lippincott Company, East Washington Square, Philadelphia, 1951.

PRIMER ON FRACTURES. Prepared by the Special Exhibit Committee on Fractures in Cooperation with the Committee on Scientific Exhibit of the American Medical Association. Ed. 6. Cloth. Pp. 109, with illustrations. Price $2.00. Paul B. Hoeber, Inc., 49 E. 33rd St., New York City, 1951.

PHARMACOLOGY. By Michael G. Mulinos, M.D., A.B., A.M., Ph.D., Associate Professor of Physiology and Pharmacology, New York Medical College, Flower and Fifth Avenue Hospitals, New York, New York. Cloth. Pp. 484. Price $5.00. Oxford University Press, 114 Fifth Ave., New York 11, 1951.

THE BOOK OF THE STATES 1950-51. Volume VIII. Cloth. Pp. 839, with illustrations. Price $7.50. The Council of State Governments, 1313 East 60th St., Chicago 37, 1950.

PHYSICAL DIAGNOSIS. By Ralph H. Major, M.D., Professor of Medicine in the University of Kansas. Ed. 4. Cloth. Pp. 446, with illustrations. Price $6.50. W. B. Saunders Company, West Washington Square, Philadelphia 5, 1951.

DIATHERMY. By Stafford L. Osborne, B.P.E., M.S., Ph.D., Professor and Chairman, Department of Physical Medicine, Northwestern University Medical School. Paper. Pp. 113, with illustrations. Price $3.00. Charles C Thomas, Publisher, 301 E. Lawrence Ave., Springfield, 1950.

ANATOMY OF THE NERVOUS SYSTEM. By Olof Larsell, Ph.D., Sc.D., Professor of Anatomy, University of Oregon Medical School, Portland. Ed. 2. Cloth. Pp. 520, with illustrations. Price $9.00. Appleton-Century-Crofts, Inc., 35 West 32nd St., New York 1, 1951.

FUNCTIONAL HUMAN ANATOMY. By Cleveland S. Simkins, A.B., Ph.D., Professor of Anatomy, Creighton School of Medicine. Cloth. Pp. 593, with illustrations. Price $12.00. Wm. C. Brown Company, 915 Main St., Dubuque, Iowa, 1949.

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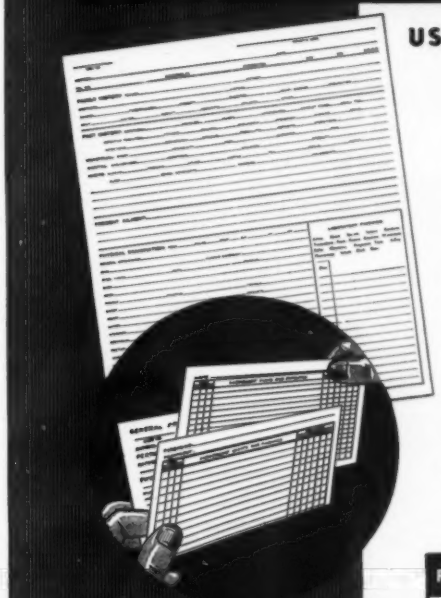

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In addition, Minerals, Trace Elements and Vitamins are now known to play both a prophylactic and therapeutic role in many specific conditions, such as, diabetes, cardiovascular diseases, undulant fever, senile dysfunctions and the many conditions requiring diet.

VITERRA provides 12 MINERALS and TRACE ELEMENTS and 9 VITAMINS to hasten convalescence and maintain optimal well-being.

12 MINERALS and 9 VITAMINS
ALL IN ONE CAPSULE

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Cobalt	0.1 mg.
Copper	1 mg.
Boron	0.2 mg.
Iron	10 mg.
Iodine	0.15 mg.
Calcium	213 mg.
Manganese	1 mg.
Magnesium	6 mg.
Molybdenum	0.2 mg.
Phosphorus	165 mg.
Potassium	5 mg.
Zinc	1.2 mg.
Vitamin A	5,000 USP Units
Vitamin D	500 USP Units
Thiamine HCl	3 mg.
Riboflavin	3 mg.
Pyridoxine HCl	0.5 mg.
Niacinamide	25 mg.
Ascorbic Acid	50 mg.
Pantothenate	5 mg.
Tocopherols, Type IV	5 mg.

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GOOD RESULTS REPORTED

in Intractable Dysmenorrhea

Filler in J.A.M.A.[1] reports remarkably good results in the treatment of intractable functional dysmenorrhea when methyltestosterone is administered for the six days *preceding ovulation*. The gratifying relief of pain in this series is attributed to the use of methyltestosterone at this particular time of the cycle. It should be noted that there was no masculinization nor interference with ovulation.

The most economical and efficient method of administering the male hormone is with Metandren® Linguets.® This unique form of methyltestosterone is specially shaped to fit comfortably between the gum and cheek and is highly compressed to insure slow, effective absorption of the hormone through the oral mucosa.

Suggested Dosage: One 5 mg. Linguet (equivalent to one 10 mg. tablet orally) three times daily for six days before estimated time of ovulation. *Metandren Linguets:* Issued in 5 mg. (white), 10 mg. (yellow), scored. Ciba Pharmaceutical Products, Inc., Summit, N. J.

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1. Filler, W.: J. A. M. A., 143: 1235 (Aug. 5,) 1950

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